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THE DETERMINANTS AND CONSEQUENCES OF POPULATION TRENDS

New Summary of Findings on Interaction of Demographic, Economic and Social Factors

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Chapter II

HISTORY OF WORLD POPULATION GROWTH

1. In the scale of the hundreds of millions of years through which range speculations as to the beginnings of various expressions of life, man has but recently appeared. According to one representation, if these aeons were transposed to the relative time span of one year, the appearance of *Homo sapiens* would take place at approximately 2000 hours on the last day of the year, with the neolithic age beginning slightly less than five minutes before midnight.[1]

2. A continuous average increase of slightly less than 0.02 per cent per year would have produced the present population of the world from two dozen individuals a hundred thousand years ago. It is certain, however, that the secular trend of man's increase at no time proceeded at a constant rate, but was interrupted by periods of decline and at other times quickened its pace. It is in the modern period that the highest rates of growth have been sustained, with marked acceleration evidenced only in the twentieth century. It is likely that to the more than 3,000 million inhabitants of the earth in 1960, approximately 600 million, or roughly twice the number thought to have been in existence at the beginning of the Christian era, will be added in the succeeding decade. Although even at the present date the estimated numbers of inhabitants of large parts of the world are seriously questioned and for the remote past they are necessarily afflicted with greater uncertainty, the probable orders of magnitude shown in table II.1 give some indication of the dramatic multiplication of mankind.

3. Man's mastery of the often hostile physical elements of his surroundings permitted his existence as a species in the first instance, and his propagation in the second. His evolution has been a response primarily to the necessity to satisfy basic needs: food, shelter, clothing. As their acquisition increased his comfort and security and a surplus afforded opportunities for the cultivation of abilities and talents, aspirations were refined. An increasing ramification gradually appeared in the social structure, the element which promises today to become of surpassing import with the gain in control over the economic mechanism.

4. In the distant past, an improved food supply that alleviated malnutrition and lessened the incidence of famine is generally credited with having given an impetus to the first slow increment of the earth's inhabitants. Conversely, an expanding population could impel a community to improve methods for its sustenance.[2] The beginning of the trend of increasing numbers early in the modern period has been linked to the initiation of social and economic advance. While in modern times the severity of the challenges to population growth has moderated, the complexity of factors affecting demographic trends has increased. To answer the many questions concerning these trends, a greater interdisciplinary co-operation among scientists has been recommended.[3] In attempting to outline the historical pattern of world population movements, this chapter draws upon the limited statistical data that have been compiled, in many instances not designed for demographic purposes. Where these data were lacking or patently inadequate, the work of archaeologists, anthropologists, geographers, economists, historians and numerous scholars in related fields has been the basis of deductions and amplifications.

TABLE II.1. CONJECTURES OF HISTORICAL POPULATION GROWTH

Date	*Population (millions)*	*Average annual increase (per cent) since preceding date*[a]	*Approximate number of years required for population to double at given rate*
B.C.			
7000-6000	5–10		
A.D.			
1	200–400	0.0	
1650	470–545	0.0	
1750	629–961	0.4	173
1800	813–1,125	0.4	173
1850	1,128–1,402	0.5	139
1900	1,550–1,762	0.5	139
1950	2,486	0.8	86
1960	2,982	1.8	38
1965	3,289	2.0	35

SOURCES: see paragraphs 11, 30 and 56, and table II.4 below; estimates for 1950, 1960 and 1965 from United Nations, *World Population Prospects as assessed in 1968* (to be issued as a United Nations publication) (1970).

[a] Rates for periods prior to 1960-1965 are calculated on the basis of population at mid point of range.

A. Palaeolithic to early historic period

5. Palaeontology and archaeology are the principal contributors to the study of earliest man, more significantly since the introduction of carbon-dating, the technique which in many instances is able to reinforce estimates

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[1] Nougier, *Géographie humaine préhistorique* (1959), pp. 14-15.

[2] Boserup, *The Conditions of Agricultural Growth* (1965), p. 75.

[3] See Eversley, "Population, economy and society" (1965), pp. 23-26; Laslett, "Introduction: the numerical study of society" (1966), pp. 1-13.

of the chronology of prehistoric events where long lapses of time are in question. Another method of arriving at inferences about the nature of prehistoric life is by the investigation of primitive societies extant, such as is conducted by anthropologists. Dating of geologic strata and deductions as to geographic conditions are further aids to understanding influences on the development of early populations.

6. Climate has been said to have exerted a major fundamental influence on human development.[4] During the course of the millions of years required for the evolution of the primates, it appears that man emerged as the dominant species during the geologic period of the Pleistocene, which began about 600,000 years ago. The greatest of the four separate glaciations which characterized this period covered about one third of the earth's land surface with ice at its most extensive phase.

7. The first stone-age industry was the means of at once increasing primitive man's food supply. The prolongation of life which resulted was not the only factor in increasing the population. It has been postulated that important to man's development into a single species was the quicker multiplication of the more successful types and the probability that they absorbed rather than extinguished rival species.[5] Leakey sees a more significant effect of the lengthened life span as permitting favourable mutations in the species to be reproduced at an accelerated rate.[6]

8. Ancestors of modern man seem to have become distinct from other lines of hominoids at least some 12-14 million years ago.[7] Skeletal remains considered as belonging to the genus *homo* approximately one-half million years old have been discovered in Java, China and other parts of Asia, and in Europe.[8] The oldest of such remnants, found at Olduvai Gorge in Tanganyika in association with stone tools and dating from about 1 million years ago, give weight to theories that it was in Africa that near-man advanced to the status of man by fashioning tools to a set and regular pattern.[9] Man's essentially biologic evolution may have been virtually completed at least 100,000 years ago. Around 50,000 years ago, following the gradual extinction of various collateral lines, such as Neanderthal man, *Homo sapiens* became established as a single species.[10] His evolution thereafter proceeded along cultural paths.

9. In addition to fashioning tools, man early mastered the use of fire, which further extended the range of his diet and habitation, encouraged closer group life and later made metallurgy possible. Hearths uncovered by archaeologists give evidence that the hunting and gathering economy did not necessarily demand perpetual migration. Governed by a first principle of settlement geography, primeval man would have located where water and natural shelter were provided and food could be found within a convenient radius, thus becoming part of a community, of "a biologic and social group, clustering about hearths at the point of least transport, holding a collecting territory for its exclusive use, and relocating itself as infrequently as necessary".[11] The long period of infantile helplessness and maturation encouraged a more sedentary way of life. Children in such an economy were more of a handicap than in an agricultural economy and there are indications that infanticide was widely practised.[12] There is no sign of promiscuous mating; for economic reasons, monogamy was apparently the rule.[13] Remnants of the oldest known dwellings, uncovered at Vestonice in Czechoslovakia, show they were constructed and inhabited in the course of the upper palaeolithic period.[14]

10. Nevertheless, migration in small bands long predominated over settlement as a population characteristic and, as adaptation to changing conditions permitted, palaeolithic man spread over Africa and Eurasia. It is believed that humans first appeared in America as immigrants, crossing over a presumed land bridge at the present Bering Strait in the neighbourhood of 20,000 years ago,[15] possibly during one of the periods when climatic conditions were less severe in northern latitudes than they are now.

11. Throughout the world, desert and recurring ice conditions isolated some groups for millennia. The density of these primitive hunting and gathering peoples varied widely according to different conditions. When Australia was first settled by Europeans in 1788, the aboriginal population is estimated to have been about 300,000 with densities of from 2.5 to 5 persons per square kilometre in the favourable coastal or river-valley areas and about 1 person per 80 to 100 square kilometres elsewhere.[16] When purchased by the United States, Alaska had an average population density of approximately 1 person per 65 square kilometres, while that of the Northwest Territories was about 1 person per 500 square kilometres. Conditions in those areas and the most severe in late glacial Eurasia may have been roughly analogous.[17] It is reasonable to assume greater densities in more southerly regions, particularly in Eurasia. In the presumably highly favourable conditions of the Egyptian region of the Nile, a population of 20,000 at the most

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[4] Huntington, *Civilization and Climate* (1924), p. 3; George, *Introduction à l'étude géographique* . . . (1951), pp. 37-53.

[5] Oliver and Fage, *A Short History of Africa* (1962), p. 18. The authors suggest that accentuation of less fundamental differences may account for various racial types.

[6] Leakey, *The Progress and Evolution* . . . (1961), p. 6.

[7] Simons, "The early relatives of man" (1964), p. 50; also his "Some fallacies in the study . . ." (1963), pp. 879-889.

[8] Hawkes, "Prehistory" (1965), pp. 34-62.

[9] Leakey, *The Progress and Evolution* . . . (1961), p. 37.

[10] Washburn, "Tools and human evolution" (1960), pp. 63-75.

[11] Sauer, *Agricultural Origins* . . . (1952), p. 12.

[12] Bates, "Human ecology" (1953), p. 707.

[13] Hawkes, "Prehistory" (1965), p. 128.

[14] *Ibid.*, p. 134.

[15] Müller-Beck, "Paleohunters in America . . ." (1966), p. 1,207, places the occurrence of this event from about 26,000 to 28,000 years ago.

[16] Mulvaney, "The prehistory of the Australian aborigine" (1966), p. 84. The author reasoned that the lack of tusked animals and scarcity of fine-grained rock were limitations on the tool industry and therefore on securing the abundance of food that would support a growing population, p. 85. Kroeber, *Anthropology* . . . (1948), p. 390, has suggested a density of twenty-five persons per hundred square kilometres for the hunting-gathering areas along the Pacific coast of North America from Alaska to California.

[17] Hawkes, "Prehistory" (1965), p. 120.

has been suggested for the end of the palaeolithic period.[18] That number in the cultivated area of the United Arab Republic around 1960 would amount to an average of approximately 1 person per 2 square kilometres. It has been estimated that about 50 million square kilometres of the earth were usable as the Pleistocene was ending, and that on an average at least 5 square kilometres per person were required to sustain the human population. This has suggested a maximum world population of 10 million,[19] with the possibility that it was as low as 5 million.

12. Analyses of fossil remains confirm that the life of prehistoric man was short and frequently ended in violent death. Those who lived in a harsh environment died younger; those in more favourable circumstances lived longer. Physical environment alone, however, did not cause early death; cultural factors also played a part, and the observation that " one of the main causes of death of early man was his being killed by his own fellow-man"[20] likely had relevance throughout prehistory. The possibility is entertained that duration of life may have lengthened slightly in the neolithic age,[21] when food was more plentiful, although in an agricultural society famine and epidemic more often than war caused sudden peaks in the death rate.

13. Few skeletons of infants have been found preserved from early periods, but it is believed that infant and child mortality was extremely high. The slight evidence available suggests that most adult deaths occurred between ages twenty to thirty years, with women dying at a younger age than men as a rule. Some studies have led to estimated crude death rates ranging from 50 to 80 per thousand in the palaeolithic period, and a life span for men about 20 per cent longer than that for women.[22] It appears that this sex-differential in mortality was general almost until the modern era.[23] Conclusions that survivors to adult ages rarely attained the age of fifty may find some support in findings at the excavated Anatolian neolithic village of Çatal Hüyük. Remnants of food, artifacts and buildings dating from the sixth millennium indicated a high degree of accomplishment, and the human skeletons were those of a healthy population; nevertheless the life-span of the inhabitants was short.[24] It has been tentatively suggested that even in the Iron Age in France, average expectation of life at birth was no more than ten to twelve years, which would have required crude birth rates to be over eighty per thousand if the population were to survive.[25] It seems that mere maintenance of the species in normal conditions would have required a minimum of three female births per woman attaining her reproductive period, given the following assumptions: a mean expectation of life of twenty years, infant mortality of about two thirds and, of the hypothetical total of six births, the survival to adult years of one female capable of bearing children. In actuality, the reproduction rate would have had to be well above this level to offset losses during periods of greater-than-usual hardship.

14. The level of mortality, governed in the past by the degree of hardship in living conditions and to a great extent in recent times by the improvement of conditions directly related to health, has been emphasized by some as the primary determinant of population increase or decrease.[26] The birth rate is given equal weight by others, who consider that even in early times indications of fertility control by means of abortion, sexual taboos and marriage customs signified a modification of attitudes favouring maximum child bearing.[27] The concept of fertility as a demographic variable, not a biologic constant, would therefore seem to have applicability throughout all times.[28] Fecundity may be viewed in a similar light, considering the effect of individual differences with respect to the number of years reproductive capacity is effective, its rate of diminution, and the instances of total infecundity.[29] It is generally concluded that there has been no change in the basic fecundity of the human species. However, the possibility of a greatly varied incidence of infanticide should be included in these considerations.

15. The evolution from a hunting and gathering economy has been accomplished in perhaps only the last 1 or 2 per cent of the duration of human existence by even the most advanced of today's societies. During a geologic period of extreme instability of climate and also of extreme simultaneous climatic contrast, modes of securing subsistence were spread by migration of peoples and cultural diffusion, and adapted to conditions in

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[18] Oliver and Fage, *A Short History of Africa* (1962), p. 26.

[19] Bates, *Prevalence of People* (1955), p. 27.

[20] Weidenreich, "The duration of life of fossil man in China . . ." (1939), p. 43; cited in Bates, "Human ecology" (1953), p. 707.

[21] Reinhard, Armengaud and Dupaquier, *Histoire générale* . . . (1968), p. 19. The authors refer to Dzierzykraj-Rogalski, "La durée de la vie humaine . . ." (1957).

[22] Acsádi, "Economic factors of the population growth . . ." (1965), pp. 2, 4, 5; Acsádi and Szabady, *Földünk lakossága* (1957), pp. 10-11, 41-43. See also Laughlin, "Eskimos and Aleuts . . ." (1963), pp. 633-645. The frailty of conclusions based on prehistoric skeletal remains is discussed by Henry, *Commentaire* [to Nougier, "Essai sur le peuplement . . ."] (1954), pp. 272-274.

[23] Goldstein, "Some vital statistics . . ." (1953), pp. 3-4, found that skeletons, dating from about A.D. 800 to 1700 of American Indians, whose culture was comparable to those of earlier stone-age peoples in other regions, indicated an average life span of thirty-one years for one group of 767 individuals and forty-three years for 587 from another locality. In so far as could be determined, males generally outlived females. A study by Jones, "The demography of the Australian aborigines" (1965), pp. 232-245, finds a reversal in this sex-differential for present-day Australian aborigines. Living under immeasurably more favourable conditions than their remote ancestors, they show an estimated expectation of life at birth of 50 for males and 50.7 for females.

[24] Mellaart, *Çatal Hüyük* . . . (1967), particularly p. 225.

[25] Nougier, "Essai sur le peuplement . . ." (1954), p. 267. It was noted that death rates may have been lower in the preceding neolithic era.

[26] Thompson, "The spiral of population" (1956), p. 975.

[27] Durand, "World population . . ." (1958), pp. 31-32.

[28] Taeuber, "Future population trends . . ." (1966), p. 192.

[29] Briefly stated, "fertility" refers to procreative performance, "fecundity" to procreative potential. This difference is discussed in detail in chapter IV. Bourgeois-Pichat includes a consideration of fecundity in his "Social and biological determinants . . ." (1967), pp. 160-163, and finds wide variations in fertility a characteristic of pre-modern societies.

widely separated locations.[30] While the earliest stone-age industry was probably of African origin, it appears that its subsequent development and the related cultural expansion, as interpreted from artifacts and drawings on cave walls, apparently received the greatest impetus in the Mediterranean region, and South and East Asia.[31]

16. The first great economic revolution—the development of agriculture and the domestication of animals—ushered in the neolithic age.[32] Present knowledge places its origin in the hills of South-West Asia about 10,000 years ago, following the final retreat of the glaciers and the cessation of the pluvial periods. There was a significant change in the physical environment at this period. Prairies south of the Mediterranean and in South-West Asia became more desiccated and were traversed by great rivers and interspersed with oases. The wind-swept interior plains became hard grass lands; great forests spread across much of Europe, northern Asia and North America. Although almost nothing is known of the beginnings of this "neolithic revolution",[33] there is some conviction that it was preceded by changes not only in the natural conditions of the environment, but in the level of culture as well.[34] No evidence has yet been uncovered to support the hypothesis that there may also have been a separate point of origin in South-East Asia,[35] but the later innovation of agriculture in Middle America seems to have taken place independently.[36]

17. One of the earliest agricultural settlements yet uncovered, Jarmo in Iraq, dating from about 7000 B.C., appears to have had about 150 inhabitants. Estimated average population density for the settled portions of the area, about 10 per square kilometres, has remained roughly the same to the present day.[37] This more sedentary way of life and greatly augmented food supply at once encouraged increases in populations which had heretofore had only a precarious tenure on existence.[38] When densities grew beyond the carrying capacity of the site, the excess numbers formed new settlements flourishing first in the Fertile Crescent;[39] their probable size has been put at from 200 to 500 inhabitants.[40]

18. There was a further diffusion of agriculture and the industries it stimulated and supported into the Near East, Central Asia, Africa, and Europe along the sea coasts and deep into the continent by way of such river valley systems as the Dnieper, the Danube, and the Rhone. By about 1500 B.C. in Europe, only the northern forest of the Scandinavian peninsula and the Russian forest and *tundra* remained untouched by it. Its effect on human multiplication is suggested in a study based on archaeological evidence for the area comprising present-day France. A maximum of 50,000 inhabitants was estimated in the final stage of the palaeolithic period, followed by decline until the beginning of the neolithic age. By the fourth millennium, the first agriculturists and forest-dwellers possibly numbered one-half million; in the next thousand years, growth to five million is considered plausible.[41] Clusters of dwellings uncovered in the Danubian culture region suggest villages in the range of 200-600 inhabitants, settlements representing "a quite revolutionary growth ... where only a few tiny bands of hunters had previously roamed".[42]

19. Increasing complexity was expressed in political organization, new institutions, a stratified society.[43] Advances in agriculture and related technology produced food surpluses sufficient to maintain communities of those who did not grow their own food and therefore could specialize in other activities.[44] The social structure of the first small towns in the fertile alluvial plain of Mesopotamia lent itself to economic development,[45] which in this locale took the form of large-scale irrigation and flood-control systems that made possible vastly greater crop

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[30] Sauer, "The agency of man ..." (1956), pp. 51-54. Hulse succinctly summarizes the historic significance of migration in stating that men everywhere tend to spread their genes, their ideas and their artifacts, given the opportunity, and that none of these are transmitted by telepathy. Hulse, "Comment" [on Newman, "A trial formulation ..."] (1958), p. 41.

[31] Leakey, *The Progress and Evolution* ... (1961), p. 10.

[32] Cipolla, *The Economic History* ... (1967), p. 18.

[33] Childe, *Man Makes Himself* (1965), uses this term in the sense that certain conditions, as the culmination of a gradual process, were analogous to those of the "Industrial Revolution" in Europe, i.e., in particular, a sudden increase in population (see chapter V).

[34] Braidwood, "The agricultural revolution" (1960), p. 134, giving weight to cultural development, states that there was not a significant change in climate in the area where farming appears to have originated. Sauer, "The agency of man ..." (1956), p. 56, sees the origins of planting and domestication in a previous sedentary society, having a surplus and leisure. See also Vidal de la Blache, *Principes de géographie humaine* (1948), pp. 74-111; Brunhes, *La géographie humaine* (1956), pp. 300-310.

[35] This hypothesis is discussed in von Wissmann *et al.*, "On the role of nature ..." (1956), pp. 285-286, with particular reference to the investigations of Smolla.

[36] MacNeish, "The origins of new world ..." (1964), pp. 29-37, dates domesticated food *c.* 6700 B.C., domesticated animals *c.* 3400 B.C., as well as the first fixed settlements, in the valley of Tehuacán in Mexico where there is the longest known record of continuous occupation in the New World.

[37] Braidwood, "The agricultural revolution" (1960), pp. 136, 138-143. Other discoveries of this period are Jericho—see Kenyon, *Archaeology in the Holy Land* (1960)—and Çatal Hüyük in Anatolia —see Mellaart, *Çatal Hüyük* ... (1967).

[38] Mumford, *The City in History* ... (1961), p. 11, suggests "... the extra security ... the relief from forced fasting, that long-proved diminisher of sexual appetite, may have given to sexuality ... an early maturation ... a potency it perhaps lacked in the anxious, often half-starved life of hunting and collecting peoples".

[39] Childe, *New Light on the Most Ancient East* (1952), pp. 122, 232-233. The author dates this early growth about 4000 B.C.

[40] Adams, "The origin of cities" (1960), p. 154.

[41] Nougier, "Essai sur le peuplement ..." (1954), p. 269.

[42] Childe, *The Prehistory of European Society* (1958), p. 50. The author states that the colonization of this vast central European territory was accomplished by reason of the fertility of the peasants and an economy principally dependent upon vegetable crops which quickly exhausted the soil. The villagers were then forced to move to a new site when all plots within walking distance were rendered infertile, pp. 49-53.

[43] Sjoberg traces the development of urbanism in the context of cultural analysis. See his "The origin and evolution of cities" (1965), pp. 25-39; also *The Pre-industrial City* (1960).

[44] This feature is generally accepted as the prime criterion for the differentiation of rural and urban sectors of society. See Davis, "The origin and growth of urbanization ..." (1955), pp. 429-430.

[45] Childe, *New Light on the Most Ancient East* (1958), pp. 118-119. It is inferred from the prominence of the temple in very early sites that religious beliefs and ceremonies were under the control of full-time priests, who required the support of the farmers.

yields. It is widely held that the collective activity required in the regulation of water and soil resources enlarged the political, economic and cultural base and provided for an accelerating human multiplication at a high density level.[46] By about 4000 B.C., what has been termed the second great revolution in human culture, the "urban revolution", had begun, described as "... an expression more of changes in man's interaction with his fellows than ... with his environment".[47] It apparently began more or less simultaneously in two oases—the Lower Nile region and Lower Mesopotamia—marking the end of a passage of 3,000 or 4,000 years in which "the life of man had changed more radically than in all of the preceding 250,000 years".[48] Recent discoveries indicate that the Harappan civilization flourished concurrently with the Sumerian and the early Egyptian, and that it extended far beyond the Indus valley, even reaching the present border between Iran and Pakistan, the Himalayas to the north and along the west coast of India to the Gulf of Cambay north of modern Bombay.[49] Somewhat later, the Hwang Ho (Yellow River) Valley provided the early centre of expanding civilization in China, and in the first millennium, Mayan civilization emerged in Middle America.

20. Conjectures as to the size of early cities cover a wide range. Where archaeologists have been able to gauge the area of ancient sites and the type and proximity of dwellings, an assumed average density may indicate the number of inhabitants. Estimates of the labour required to erect the characteristic monumental structures, written records on clay tablets and extent of cemeteries are among the clues considered in dispelling some of the mystery. The city-states of Sumer were an outgrowth of the need to administer its system of irrigation agriculture, and those with a situation favourable to commerce and industry expanded accordingly. Recent excavations at Uruk suggest a population of 50,000 about 2500 B.C.[50] Remains of the great capital city of Ur suggest that the built-up area may have comprised a population of around 200,000 early in the second millennium,[51] while the uncovering of a provincial city of that time indicates it had about 9,000 inhabitants.[52] Thebes, as the capital of Egypt, could have had around 225,000 inhabitants about 1600 B.C.[53] However, for this initial period of urban development it has been judged that the number of cities did not increase significantly and that in general their size remained in the scale of 2,000 to 20,000 inhabitants until well into the first millennium.[54] One reason for this lack of growth may have been the static condition of technology until after iron first came to be used in the Near East, about 1300 B.C.[55]

21. In the ancient domains, technical and economic advance included the development of metallurgy, the introduction of writing systems, and the elaboration of handicraft, commerce and the division of labour. More complex political systems and new modes of construction were also introduced. The relation of city-centred civilizations and the more primitive farming societies remains obscure. Technical advances presumably were complementary in these societies, stimulating the growth of population both in the urban civilizations and in rather distant primitive communities.[56] Thus, a fairly continuous area of increasing population density extended across North Africa and Southern Europe, and Southern Asia and in isolated areas of Eastern Asia as well. There were, nevertheless, great regional differences, accentuated by frequent calamities, warfare and shifting centres of political control. These trends reached temporary culminations in the Seleucid and Sassanid Empires in Persia, Asoka's Empire in India, the Han Empire in China and in the Roman Empire in the Mediterranean basin, all within a few centuries before or after the beginning of the Christian era.

22. Where the frontiers ot agricultural society were not marked by forest but by steppe or desert, the consolidation and expansion of farming communities gave rise to pastoral nomadic societies, notably in central and South-West Asia and North Africa. Recurrent invasion by such nomads and by forest dwellers constituted a persistent pressure on the early empires of antiquity, and strong frontier tensions of this kind remained a slowly diminishing check to the expansion of settlement, and probably of population growth, until recent history.[57]

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[46] Wittfogel has estimated that in the 3,000-4,000 years prior to the growth and expansion of population associated with the Industrial Revolution, 60 to 70 per cent of the world's population lived under conditions shaped by hydraulic civilizations. See Thomas, *ed.*, *Man's Role* ... (1956), p. 418. See also Adams, "The origin of cities" (1960), p. 157; Woolley, "The beginnings of civilization" (1965), pp. 415 ff.

[47] Adams, "The origin of cities" (1960), p. 153. Childe places this event in a unilinear historic development, *Man Makes Himself* (1965). Wittfogel, "The hydraulic civilizations" (1956), pp. 152-164, first classifies societies as based on rain, small-scale or large-scale irrigation agriculture, the latter associated with the first major Eastern civilizations. Adams, "The origin of cities" (1960), p. 157, suggests that border disputes between neighbouring communities dependent on irrigation agriculture drew people together in offensive or defensive concentrations. See also his *The Evolution of Urban Society* ... (1965). Mumford, *The City in History* ... (1961), pp. 29-39, presents the concept of an "urban implosion", a gathering in a limited area of many heretofore scattered and unorganized functions.

[48] Braidwood, "The agricultural revolution" (1960), p. 148.

[49] Dales, "The decline of the Harappans " (1966), pp. 92-100. See also Woolley, "The beginnings of civilization" (1965), pp. 395-397, 451-458.

[50] Adams, "The origin of cities" (1960), pp. 160, 166.

[51] Kramer, *The Sumerians, Their History, Culture and Character* (1963), pp. 88-89.

[52] Woolley, "The beginnings of civilization" (1965), p. 428. This author considers the possibility of a population of 360,000 for Ur about 1700 B.C. D'iakonov, *Obshchestvennyĭ i gosudarstvenny-stroĭ* ... (1959), estimates 100.000 inhabitants for ancient Lagash.

[53] Davis, "The origin and growth of urbanization ..." (1955), p. 431.

[54] Mumford, *The City in History* ... (1961), p. 62.

[55] Davis, "The origin and growth of urbanization ..." (1955), p. 431.

[56] A requirement of fifty to ninety farmers to support one man in a city has been suggested, *ibid.*, p. 432. According to Thompson, "The spiral of population" (1956), pp. 970-986, every change in man's techniques of production and in social organization affecting his ability ... to use his labour effectively, "favoured an increase in his numbers as long as he accepted a subsistence, or near-subsistence, level of living as his inevitable lot ", pp. 970-971.

[57] Lattimore, *Studies in Frontier History* ... (1962), pp. 24-26, 141-154, 256-258, 484-488, 495-496, 503-506.

23. Thus, prehistoric and early historic developments resulted in the emergence of what could be viewed as four major types of economic regions in the world with their related demographic features:

(*a*) Associated city-centred, agrarian and commercial civilizations occupying the Mediterranean basin, extensive areas in Eastern Asia, and an independent zone of similar character in Middle America;

(*b*) Adjacent regions of village economy, extending into more isolated regions and including woodlands, of Northern Europe and Asia and to a lesser degree in the western hemisphere;

(*c*) Nomadic and semi-nomadic areas in inner Asia, bordering steppe lands and, to the south, the Sahara-Arabic belt;

(*d*) Hunting, gathering and fishing economies of tribal societies in Africa south of the Sahara, Oceania and most of North and South America.

B. Population of the ancient world

24. Large parts of the world's population were subject to some forms of partial census enumeration near the beginning of the Christian era, but the information gleaned from such censuses is of limited value. For most regions, of course, this kind of information is lacking. Modern investigators must, therefore, rely on summary figures and estimates in ancient manuscripts; on inferences from archaeological evidence; on records of such things as grain imports, taxes, and military forces; or on some combination of such sources in the context of other historical information.

25. More plentiful sources of information and close studies made of them permit clearer discernment of trends for Europe and the Mediterranean region at this time. Indications are that by this period a decline in the free population of Greece was already established. In some of the Greek states after the age of Pericles this was probably due initially to war losses, epidemics, and migration to other regions. Later decline must be interpreted as resulting from the avoidance of marriage, avoidance of child-bearing within marriage, and exposure of infants. [58] A similar tendency, perhaps less extreme in degree, characterized later Roman society. The prevalence of slavery should also be noted as an inhibiting factor to population increase. Segregation of the sexes and high mortality prevented procreation among this appreciable class of society.

26. Roman censuses, taken for administrative purposes, were most frequently concerned only with citizens. Sometimes only adult males were included; in other circumstances, all household members except children. [59] In 1866, Beloch presented estimates of the area and population of the Empire which show a total of 54 million persons at the death of Augustus in A.D. 14, as given in table II.2. Estimates of later students range from 50 to 70 million, with upward revision of Beloch's estimate generally favoured. [60] More recently, the hypothesis of 100 to 110 million has been seriously considered. [61] Walek-Czernecki concluded that the population of Egypt must have been around 8 million in the Ptolemaic era and perhaps as high as 9 million in the first century A.D. [62] French historians have since concluded that Beloch's estimates for the area which is now France were too low. [63] Cavaignac, adjusting the records used by Beloch for an assumed omission of children, estimated 80 million persons in the Empire at the time of Augustus. He further estimated an increase to 150 million by A.D. 180. [64] Although Cavaignac's conclusions have not been generally accepted by other competent students, it is widely agreed that the total population of the Empire increased during the first two centuries after Augustus. [65]

TABLE II.2. ESTIMATED AREA AND POPULATION OF THE ROMAN EMPIRE, A.D. 14

	Area (thousands of square kilometres)	*Population (thousands)*	*Persons per square kilometre*
Total Empire	*3,340*	*54,000*	*16*
European part	*2,231*	*23,000*	*10*
Italy.................	250	6,000	24
Sicily	26	600	23
Sardinia and Corsica ..	33	500	15
Narbonensis	100	1,500	15
Three Gauls	535	3,400	6.3
Danube	430	2,000	4.7
Greece	267	3,000	11
Spain	590	6,000	10
Asiatic part	*665.5*	*19,500*	*30*
Province of Asia	135	6,000	44
Rest of Asia Minor ...	413	7,000	17
Syria	109	6,000	55
Cyprus	9.5	500	52
African part	*443*	*11,500*	*26*
Egypt	28	5,000	179
Cyrenaica	15	500	33
Province of Africa	400	6,000	15

SOURCE: Beloch, *Die Bevölkerung der griechisch-* . . . (1886), p. 507.

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[58] Bérard, "Problèmes démographiques dans l'histoire . . ." (1947); Landry, *Traité de démographie* (1949), pp. 44-47. The historian Polybius observed," . . . the whole of Greece has been subject to a low birth-rate and a general decrease of the population" and attributed this condition to men's having "fallen into such a state of pretentiousness, avarice and indolence that they did not wish to marry, or, if they married, to rear the children born to them, or, at most as a rule, but one or two of them . . .". Polybius, *Histories* (*c.* 140 B.C.; 1927 ed.) vol. 6, bk. 36, p. 385. Wolfe, however, doubted that this statement, even if true of the "urban bourgeoisie", was true of the behaviour of the "miserable country folk". See his "The economics of . . ." (1932), p. 36.

[59] Landry, *Traité de démographie* (1949), pp. 14-32.

[60] Boak, *Manpower Shortage* . . . (1955), p. 5; see also Russell, "Late ancient . . ." (1958), p. 7.

[61] Pareti, *The Ancient World* . . . (1965), p. 820.

[62] Walek-Czernecki, "La population de l'Egypte ancienne" (1938), p. 13.

[63] Landry, *Traité de démographie* (1949), p. 53. Nougier suggests 8.5 million for France in the second century A.D.; see his "Essai sur le peuplement . . ." (1954), p. 262.

[64] Cavaignac, "Notes de démographie antique" (1935), pp. 8-9.

[65] Under Augustus, according to Nilsson, *Imperial Rome* (1962), p. 330, every noble Roman aged 25 to 60 was required by law to be married or betrothed; married men were given preference for state office, and the parents of three or more children received special distinction.

27. There are references to censuses in Chinese histories for several centuries before the Christian era, but the totals given are subject to wide and inconclusive interpretation. The avoidance of enumeration was often politic, as where the consequences concerned taxation or military service. Statistics dating from A.D. 2 have been profitably analysed in spite of their many deficiencies, such as the exclusion of non-Chinese, nobles, slaves, and inmates of monasteries and the tendency to overlook women and girls. For this year, an estimate based on the number of households arrived at a population of 71 million for a China corresponding roughly to the present boundaries. [66] No allowance was made for omission of households or of the non-Chinese population, and a higher total is entirely plausible.

28. No extensive census enumerations appear to have been made in ancient India. For Asoka's Empire at the beginning of the third century B.C., figures of 200 to 400 million have been advanced. [67] It seems impossible to place much reliance on any specific estimate of total population in India at this early date, but it is known that large portions of the Indian subcontinent were already well developed.

29. For other parts of the world, no conjectures based on contemporary records seem possible. This deficiency is most serious in West and South-East Asia, where civilization was well advanced. In Northern Europe, sub-Saharan Africa, Northern Asia, Japan, the Americas and Oceania the evidence points to relatively sparse habitation in neolithic and bronze age conditions for some parts, but society in much of the regions was at the pre-agricultural stage.

30. On the basis of these estimates and considerations, it may be proposed that the world population was probably between 200 and 400 million at the beginning of the Christian era.

C. Population trends: ancient to modern times

31. In the first millennium of the Christian era there was no sustained increase in the population of the old centres of civilization, but wide fluctuations, with occasionally very heavy losses. The population of the Roman Empire may have remained fairly constant until near the end of the fourth century, with divergent trends in different parts of the Empire. There was a slow increase of the dense population in the centres of ancient civilization (Asia Minor, Egypt and Syria) but likely a decrease in the western provinces racked by economic and political crises and barbarian invasion. [68] A repetition of tribal migrations and vast movements of nomadic populations again had a powerful impact on Eurasian demographic history.

32. The fifth century saw the collapse of the Western Roman Empire when it was completely overrun by Germanic tribes. It was in this century also that the Huns swept into Europe as far as France, a few centuries after their incursions into China and India. The Arabs began their expansion in Asia, Africa and parts of Southern Europe with the rise of Islam in the seventh century, and in the thirteenth century, the pressures of the Mongol Empire, extending from China to Russia, were felt as far west as Poland and Hungary. There were also invasions into Europe by the Magyars in the ninth century and aggressive expansion by the Vikings. These continual shifts of population reflected widespread hardship and political instability. Among the numerous principalities of India, "... a king was normally at enmity with his immediate neighbours ...", [69] while for the peasant, the great enemy was drought. The introduction of Moslem rule by Turks brought not only religious strife, but added to the convulsions of rising and falling dynasties. The evidence of setbacks in China's growth have likewise been attributed in large measure to the disruption attendant upon dynastic successions.

33. Following the decline of Roman authority in the west, the destruction and depopulation caused by barbarian invasions were most intense in certain frontier regions, notably in Dacia (the lower Danubian region). In contrast, to a large extent barbarians were absorbed into the more firmly established populations of Italy, Spain, and Narbonese Gaul (part of southern France), without severe disruption of economic processes, according to one view. [70] Interpretations of economic history indicate to others, however, severe depression; communication and commercial channels were disrupted, the fields deserted and cities contracted. [71] These conditions were seen as arising not so much out of political disintegration, but rather from an aggravation of weaknesses inherent in the economic base of the former empire: lack of technical advance, relative low population density in the hinterlands of the small cities, and a consumer segment composed of the very wealthy living on the produce of their own estates and the very poor barely subsisting. [72] The institution of slavery, a deterrent to economic as well as population growth, persisted during the greater part of this millennium and even longer in the Mediterranean zone of Moslem expansion. Military captives augmented the slave population, and the slave traffic included the sale of children. Serfdom also contributed a restraining effect on demographic growth, with its limitations on the peasants' freedom to move, to marry and to control the disposition of their children. [73] To these adverse economic and social factors and the added devastation in the Mediterranean basin of the plagues of the sixth century were attributed the principal cause of the demographic decline.

34. After the turn of the millennium, an economic and demographic upsurge was in evidence in most of Europe. Between the eleventh and thirteenth centuries, numerous new communities emerged in Western and Eastern Europe. Signs of urban revival were already

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[66] Durand, "The population statistics ..." (1960), p. 221.

[67] Nath, *A Study in the Economic Condition* ... (1929), p. 118.

[68] Beloch "Die Bevölkerung im Altertum" (1899), pp. 510-513.

[69] Moreland and Chatterjee, *A Short History of India* (1953), p. 119.

[70] Beloch, "Die Bevölkerung Europas ..." (1900), pp. 406-407.

[71] Reinhard, Armengaud and Dupaquier, *Histoire générale* ... (1968), pp. 60-61.

[72] Lot, *The End of the Ancient World* (1953), pp. 72-75, 78-80.

[73] Reinhard, Armengaud and Dupaquier, *Histoire générale* ... (1968), p. 66.

evident in Italy by the eighth century, and by the twelfth and thirteenth centuries the cities, particularly in the north, had begun to expand beyond their old Roman walls.

35. The population of Italy fluctuated within a narrow range, and by the thirteenth century was slightly above 8 million, according to one author, [74] indicating a recovery to near Imperial Roman levels. With continuing fluctuations and slow increase, it has been considered probable that a level of about 11 million was reached by 1560, where it likely remained until the beginning of the eighteenth century. [75] Conditions in Spain during the Middle Ages, such as frequent changes of territory, the invasion and settlement by the Moors, and almost continual warfare, make it difficult to come to a conclusion about the size of the population during that period. Ten million has been estimated at the end of the fifteenth century and, after a drastic decline, somewhat over ten million at the end of the eighteenth century. [76]

36. Farther north, fragmentary evidence suggests that recovery and growth were faster. Levasseur raised Beloch's estimate of 5.7 million for the population of Roman Gaul to about 8 million and assumed a similar figure for the time of Charlemagne. [77] An analysis of a hearth count in the year 1328 provides a benchmark for French demographic history from which one author concluded that the population in the territory corresponding to Roman Gaul was then considerably over 20 million. [78] This estimate has been found implausibly high by many French scholars, one reason being that the resulting population density of 40 per square kilometre could not have been supported by the French economy at that time. [79] Nevertheless, substantial growth since Roman days was certain. The population was thereafter greatly decreased by one third to one half because of famine, the Black Death and the Hundred Years War in the course of the fourteenth and fifteenth centuries. Gains in the sixteenth century were checked by the religious wars (1565-1580).

37. Archaeological evidence for the population in Britain of Roman times has led to estimates of between 0.5 million and 1.5 million inhabitants. [80] The great survey of 1860, recorded in the Domesday Book, is the first substantial basis for estimates. A total of about 1,100,000, approximately equivalent to the "medium" estimates for Roman times, is indicated. [81] Monastic records and other local evidence point to a threefold or fourfold increase in the next 250 years. Subsidy Rolls of 1377 originating in the poll tax levied to finance participation in the Hundred Years War provide another benchmark and, after consideration of the evidence of plague mortality, a pre-plague estimate for 1348 of 3.7 million or more is obtained. [82] Life-table methods show a decrease of 40 per cent from 1348 to 1377, and another decline of approximately 25 per cent by the first decade of the fifteenth century which may have reduced the population to about 2,100,000. The evidence then shows a slow increase to about 3,200,000 in 1545. [83]

38. The most rapid increases of population in Europe during the mediaeval period took place north of the Alps and west of the Carpathians, where the enlargement of forest clearings and the extension of agriculture provided an economic basis for the support of additional people. [84] An increase has been assumed for Germany from 2 or 3 million in Caesar's time to some 12 million at the beginning of the fourteenth century. [85] The general expansion of the sixteenth century was notable in this region after set-backs from plague in the preceding century. Likewise, in the seventeenth century the general stagnation in much of Europe was pronounced in the German states, which suffered severe losses from the Thirty Years War (1618-1648), possibly as many as 40 per cent of the inhabitants. [86] For the present area of Czechoslovakia, an estimate of about 0.5 million inhabitants has been given for the fifth century. Around the middle of the seventeenth century, after drastic reductions resulting from the Thirty Years War and emigration, its population may have been close to 3 million. A population of 6.3 million has been estimated for 1787. [87]

39. The eastern branch of the Slavic nations in East-central Europe grew and extended their area of habitation into the Russian plain. [88] Urlanis estimated the population of Russia, after the occupation of the forest zone by Slavs, as 8.6 million persons at about A.D. 1000. [89] Estimates based on the census by Peter the Great in 1724 indicate a population of about 18 million within his realm. [90] The steppe zone, south and east of this area, was still occupied by nomadic tribes.

40. The population of the Near East fluctuated around a fairly constant level during most of the mediaeval period, but there were sharp localized reverses resulting from the destruction or out-movement of population, notably in Mesopotamia, Persia, and Turkestan. [91] The great irrigation system east of Baghdad ceased to function by the end of the twelfth century and depopulation

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[74] Russell, "Late ancient . . ." (1958), p. 109.

[75] Landry, *Traité de démographie* (1949), p. 55.

[76] Vandellos, "La evolución demográfica . . ." (1934), pp. 180-190.

[77] Levasseur, *La population française* (1889), pp. 100-101.

[78] Lot, " L'état des paroisses . . ." (1929), pp. 296-304.

[79] Reinhard, Armengaud and Dupaquier, *Histoire générale . . .* (1968), pp. 89-92.

[80] Collingwood, "Town and country . . ." (1926), p. 276; Usher, "A new estimate . . ." (1930); Wheeler, "Mr. Collingwood and Mr. Randall . . ." (1930); Collingwood, *An Autobiography* (1939), p. 135.

[81] As with most such early household counts, the choice of a multiplier is critical; assuming that there were five persons to a household, a figure of 1.35 million has also been derived.

[82] Russell, *British Medieval Population* (1948), p. 246.

[83] *Ibid.*, p. 235.

[84] Usher, "The history of population . . ." (1930), pp. 130-132.

[85] Landry, *Traité de démographie* (1949), p. 55; in agreement with Beloch.

[86] Franz, *Der dreissigjährige Krieg . . .* (1961), p. 47.

[87] Czechoslovakia, Vydala ústřední správa geodézie a kartografie, *Atlas obyvatelstva ČSSR* (1962), pp. 24-25.

[88] Kyuchevsky, *Kurs russkoy istorii* (1937), pp. 19-20.

[89] Urlanis, *Rost naseleniyia v Evrope . . .* (1941), p. 89.

[90] Lorimer, *The Population of the Soviet Union . . .* (1946), p. 10. See also Kabuzan, *Narodonaselenie Rossii . . .* (1963).

[91] Usher, "The history of population . . ." (1930), p. 118.

followed. In the fourth century, the eastern region of the Roman Empire is believed to have had a larger population than its counterpart in the west, increasing to about 30 million by the middle of the sixth century.[92] A factual basis for estimating the population of the Byzantine Empire is almost non-existent, but it seems indisputable that demographic decline accompanied the economic reverses, pestilence and wars of its last centuries. However, under early Ottoman rule there was at least vigorous urban growth; Istanbul is thought to have grown from 100,000 to 700,000 in the century between 1478 and 1580.[93] There is no adequate basis for assuming a distinct trend for the area as a whole, but for the end of the sixteenth century a total of 16 million has been proposed for the European and Asian parts.[94]

41. There has been agreement that India's population was probably about the same at the beginning of the modern period as it had been two thousand years earlier. After periods of some increase, calamities of one form or another wiped out a large part of the population, leaving the long-run trend more or less stationary[95] (see table II.3).

42. Advanced and likely populous civilizations were formed and destroyed in other parts of Asia, in Cambodia, for example, and in Ceylon, which has been described as a demographic prototype of South Asia. Architectural ruins and interpretation of the ancient writings suggest a sizable population supported by irrigation agriculture; a possible maximum between 7 million and 8 million has been hazarded from calculations of probable rice-paddy production in early times.[96] Apparently, high fertility offset high mortality and population and resources maintained a favourable balance over many centuries, with irrigation agriculture reaching its highest development in the twelfth century.[97] Thereafter, neglect of the irrigation works, possibly as a result of foreign invasion and internal strife, undermined the economic foundation of the civilization. Numbers were greatly reduced by malaria and other diseases, as well as by famine. No official basis for an estimate prior to 1789 is available, for which date a total of 1.8 million has been given.[98]

43. Only for China is there a more or less continuous record which shows fluctuations that Chinese tradition and modern scholarship alike have interpreted as related to dynastic growth and decay. According to Chen's interpretation, the beginning of a new dynasty was ordinarily followed by a period of peace and order, of cultural development and population growth. As time went on, the increasing density of population exceeded the development of improved farming techniques and gradually the struggle for existence was intensified. Then came a period of famine and pestilence with a consequent reduction in population.[99] Lattimore, in interpreting the sequence of population change, emphasized the importance of migratory invasions by nomads from inner Asia into Chinese agricultural societies at times of internal confusion.[100] A summary of estimates is given in table II.3. In broad outline, the course of Chinese population is seen as coinciding roughly with contractions and expansions assumed to have occurred in Europe, especially after the first millennium, with a tendency for Chinese populations to be some fifty per cent larger.

TABLE II.3. ESTIMATED POPULATION IN SELECTED ASIAN COUNTRIES: ANCIENT TO EARLY MODERN PERIOD

Dynasty and selected years	*Year or period*	*Population (millions)*	*Year or period*	*Population (millions)*
	China[a]		*India-Pakistan*	
	A.D.		B.C.	
Western Han	2	71	300[b]	100–140
			A.D.	
			1600[c]	110
Eastern Han	88	43	1750[d]	160–214
	156	62		
			Japan[e]	
Sui	606	54	A.D.	
T'ang	705	37	859– 922	3.8
	755	52	990–1080	4.4
			1185–1333	9.8
Sung	1014	60	1573–1591	18.0
	1103	123	1750	26.0
Ming	1393	61		
Ch'ing	1751	207		

[a] Durand, "The population statistics . . ." (1960), p. 249. Ping-ti Ho estimates about 65 million for late fourteenth century, 130 million *c.* 1500 and 150 million *c.* 1600; Ho, *Studies on the Population* . . . (1959), p. 264.

[b] Nath, *A Study in the Economic Condition* . . . (1929), p. 117.

[c] Datta, "A re-examination of Moreland's estimate . . ." (1960), p. 182. Moreland, *India at the Death of Akbar* . . . (1920), pp. 9-22, arrived at an estimate of 100 million; Davis suggests 125 million, *The Population of India* . . . (1951), p. 24.

[d] Durand, "The modern expansion . . ." (1967), p. 138.

[e] Ishii, *Population Pressure* . . . (1937), pp. 3-7.

44. In Japan, agriculture seems to have been practised for more than two thousand years preceding the modern period, but neolithic conditions persisted in the north of the country until the end of the first millennium A.D. On the basis of records of land distribution, Japanese scholars have prepared the estimates given in table II.3, which show a substantial growth in the Middle Ages. By the end of the seventeenth century, population may have grown to 25 million.[101]

45. On the basis of urban data, the population of Egypt has been put as low as 2.7 million at the time of the Arab conquest,[102] and under Turkish rule some centuries later it again suffered a drastic decline.[103] An estimate

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[92] Reinhard, Armengaud and Dupaquier, *Histoire générale* . . . (1968), p. 78.

[93] Barkan, "Quelques observations . . ." (1955), p. 292.

[94] Reinhard, Armengaud and Dupaquier, *Histoire générale* . . . (1968), p. 85.

[95] Nath, *A Study in the Economic Condition* . . . (1929), p. 117, "the population of the country as a whole did not vary greatly between the early Hindu period and the first advent of the Mohammedans, and it may be supposed to have lain roughly between the . . . limits [of] 100 to 140 million".

[96] Sarkar, *Demography of Ceylon* (1957), pp. 1, 6, 11, 18.

[97] Taeuber, "Ceylon as a demographic laboratory . . ." (1949), p. 296.

[98] Sarkar, *Demography of Ceylon* (1957), p. 22.

[99] Chen, "Population in modern China" (1946), p. 4.

[100] Lattimore, *Inner Asian* . . . (1940), pp. 279-334.

[101] Taeuber, *The Population of Japan* (1958), pp. 14, 20.

[102] Russell, "Late ancient . . ." (1958), p. 91.

[103] Beloch, "Die Bevölkerung im Altertum" (1899), p. 506.

of 2.5 million has been given for the end of the eighteenth century and only in the course of the nineteenth century did it attain levels comparable to those of the Ptolemaic Empire.[104]

46. For sub-Saharan Africa, demographic evidence is absent and even circumstantial historical information has been assembled only recently. The formation of the Sudanic states before the end of the first millennium and the emergence of extensive flows of trade constitute presumptive evidence of at least local increases.[105] Between the thirteenth and fifteenth centuries, signs of settlement and prosperity multiplied in East Africa, and to the west the Guinean states emerged. Exploration by Portuguese navigators in the first half of the fifteenth century opened about 4,000 miles of African coast, from the Senegal River to Angola, where trading centres for the overseas slave traffic were established. The first exports went to Europe in small numbers and then, after the discovery of the Americas, across the Atlantic in increasing volume.[106] The slave trade did not reach significant proportions until the seventeenth century, when of the untold numbers captured, almost three million Africans are thought to have survived the rigours of captivity and transport to be landed in the Americas. This traffic in itself need not have resulted in depopulation in West Africa, but with the added effects of social and political disorganization, expecially in later periods, such may have been the consequence. Losses in more sparsely populated East Africa would seem to have been disastrous.[107] In the longer run, however, it is believed that large migrations into Eastern and Southern Africa ultimately produced substantial settlement there. The overseas shipment of human cargo lasted for more than four centuries (1442-1880), for "... local African custom, the profits of the trader, the needs of the planter, and the barrenness of Negro women under slave conditions, all combined to impose the need for continued importation of Negroes to supply a labour market always being depleted".[108] Although no pretension to accuracy can ever be made, a conjecture of the number captured has been as high as 20 million. It has been further estimated that perhaps only one third of those captured survived to be placed on sale in the New World.[109]

47. In the Americas, European conquest led to native depopulation, particularly drastic in what is now Latin America. The indigenous population had remained sparse in most of North America, but in Middle and South America and in Mexico the practice of sedentary maize agriculture and the urban, metal-using cultures of the Aztecs, the Incas and the Chibcha had favoured population growth for some centuries and supported sizable agglomerations. The population of the Caribbean, numbering hundreds of thousands in the pre-Hispanic period, disappeared within a few decades following the Spanish conquest. For central Mexico, comprising about 25 per cent of the present-day area of the country, a decline from around 25 million in 1519 to slightly over 1 million near the end of the century has been suggested, with a recovery to about 3.7 million by 1793.[110] Rosenblat arrives at approximately 3 million for this date, and in general takes issue with the methods of Borah and Cook in obtaining estimates.[111] In South America, especially in the Andean regions, infectious diseases of European origin are believed to have spread even in advance of the Conquest and within a short time after that event to have reduced a population of many millions to a much smaller size. Willcox's estimate of 12 million for Latin America in 1650 (with which Carr-Saunders agreed, but which Willcox later revised to 7 million) may represent a mere fraction of a previously much larger population.[112] The figure of one million for North America at that date is generally accepted.

48. In summary, it appears that following the stagnation of the Dark Ages, there were beginnings of expansion of population in the period A.D. 1000-1650. Growth in Europe shifted from the Mediterranean area of antiquity to the north-west and notably to the central and eastern regions of active colonization. Growth was probably substantial in China, greater in the south than in the north as heretofore, and in Japan. India seems to have remained unchanged, as did Africa where it is believed that there were gains in the east and south balanced by losses in the west. Western Asia experienced decline, and a burgeoning indigenous American population was cut back drastically by disease and despair following European conquest.

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[104] Issawi, "Population and wealth ..." (1956), pp. 690-691.

[105] Ibn Battuta, visiting the Mali Empire in the fourteenth century, noted its agricultural and commercial prosperity, and the ease and safety of travel. See Oliver and Fage, *A Short History of Africa* (1962), p. 89.

[106] Tannenbaum, *Slave and Citizen* ... (1947), pp. 14-16. The European slavers' activities were confined to the ports; their supply from the interior was totally controlled by the Blacks for three centuries. Slavery in Africa was part of the cultural scene, but its conditions were not to be compared to the harshness of those which existed in the Americas; see Elkins, *Slavery* ... (1963), pp. 95, 96.

[107] Oliver and Fage, *A Short History of Africa* (1962), pp. 120-122.

[108] Tannenbaum, *Slave and Citizen* ... (1947), pp. 14, 36. On the average, an African slave was expected to survive about eight years on a Brazilian plantation; Furtado, *The Economic Growth of Brazil* ... (1963), p. 46.

[109] Tannenbaum, *Slave and Citizen* ... (1947), p. 29. The author briefly refers to early records of numbers of African slaves in Europe and the Americas at different dates, and the extent and implications of this traffic as a commercial venture; see pp. 5-20, 30-38.

[110] Borah and Cook, *The Aboriginal Population* ... (1963), pp. 4, 88; tribute records were studied as the source of these estimates. The figure of 25.2 million is based upon a family size of 4.5. A possible family-size factor of 3.5 would give a total population of 20 million; one of 5.0, 28 million. From various interpretations of other aspects of the material, the range would be 18.8 million to 26.3 million. The authors calculated the population to be about 6.3 million in 1548. See also their *The Population of Central Mexico in 1548* ... (1960) and Cook and Simpson, *The Population of Central Mexico* ... (1948), p. 38.

[111] Rosenblat, *La población de América en 1492* ... (1967), p. 26.

[112] Willcox, "Increase in the population ..." (1931), p. 62; and his *Studies in American Demography* (1940), pp. 37-38. Carr-Saunders, *World Population* ... (1936), p. 30. The population of pre-conquest Latin America remains a subject of much controversy. Rosenblat proposes about 12.5 million for 1492: *La población indígena* ... (1954), vol. 1, p. 102. Chaunu, "La population de l'Amérique indienne ..." (1964), p. 117, on the basis of estimates for central Mexico in Borah and Cook, *The Aboriginal Population* ... (1963), would at least double the figure of 40 million which was rejected by Rivet as too high; see Rivet, *Les origines de l'homme américain* (1957).

49. Such declines in mortality as occurred were not sustained for a significant length of time; increased density brought about by more prosperous conditions carried with it greater vulnerability to epidemic disease. The most severe scourges were the Plague of Justinian and the Black Death. The first apparently spread from a source in the hinterland of South-West Asia throughout the world, from A.D. 542 to the end of the century. Estimates have been given that half the Byzantine Empire was destroyed by A.D. 565, and that the total cost to the world was 100 million persons. The Black Death reached Europe in 1346, probably from Central Asia, and has been described as the most frightful pandemic ever to afflict mankind.[113] Even before the appearance of this scourge, however, an upsurge in European population growth had slowed.[114]

50. During these centuries, periods of famine, pestilence and war alternated with recovery in most areas, with consequent slow net population increase for some. In the century following the Plague, recovery seems to have been most rapid in Italy,[115] but for many regions there is evidence of great contraction, abandonment of homesteads and villages and of labour shortage.[116] There was resumption of demographic growth by A.D. 1500 and, in general, the sixteenth century was one of expansion, notably in the German frontier regions. Although fertility was generally high, it cannot be assumed that it was at a maximal "natural" level. As discussed in chapter IV, the postponement of marriage reduced fertility considerably below its highest potential in Europe; in all parts of the world sexual taboos, extended periods of lactation and abortion are assumed in different measure to have restrained reproduction, and resort to infanticide and abandonment of infants was a further deterrent to population growth.

51. The relationship between population growth and economic development was complex. Population increases seem to have induced migration and conquest but colonization also provided the opportunity to multiply, and the sustained movements in population seem to have been responses to conditions that favoured peaceful extension of cultivation and commerce. The uniformities sometimes observed in the movements of population in different regions raise the question whether climatic change, affecting harvests, and autonomous variations in the intensity of epidemic diseases were factors which decisively affected demographic growth.[117]

52. The estimates of world population at the middle of the seventeenth century, referred to in section E below, remain indications of the order of probable magnitude rather than measurements. They cannot be used to test propositions about the dynamics of population growth, but the impression that world population in 1650 had not yet doubled its size in the early years of the Christian era is compatible with the view that the rate of expansion was lower in this period than in the preceding several thousand years.

D. Population growth in the modern period

53. Early in the modern period in Europe, the nation-state as a political entity had evolved, with an administrative machinery adaptable to a vast expansion of commerce and the exploitation of overseas settlement. The new mercantilist policy included in its body of theory expressions by some writers on the benefits of a numerous population (see chapter III, section B). Recognition of the utility of statistical data for many activities of government fostered speculation as to the number of a country's inhabitants. Prompted by the vagaries of current speculation, John Graunt attempted a more careful estimate of the population of England and Wales, published in 1662.[118] Various suppositions concerning size of populations were examined by Riccioli, who produced in 1661 what was perhaps the first considered attempt to estimate the population of the world.[119] Later, partial enumerations and estimates for limited areas were undertaken, and even a few counts of whole populations attempted. An instance of the latter was the series of house-to-house counts of all inhabitants in the colony of New France, that taken in 1665 probably being the first total census ever accomplished. The first total national population census in continental Europe was completed in Sweden in 1749, but it was not until 1801 that France and England overcame resistance to a similar undertaking. The newly established United States of America included a provision in its Constitution for decennial censuses and promptly conducted the first in 1790.[120]

54. Such early endeavours and subsequent progress in more precise population accounting, including registration of vital statistics, were principally confined to areas of European settlement. In China, systems of registration designed to serve various purposes over the centuries have been subject to a number of interpretations as sources of population totals.[121] Early Japanese counts were not preserved and the practice was gradually abandoned. A resumption of national census-taking in the eighteenth century was not representative of the total

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[113] See Hirst, *The Conquest of Plague* . . . (1953), pp. 10-16.

[114] Helleiner, "Europas Bevölkerung und Wirtschaft . . ." (1954), pp. 254-269.

[115] Cipolla *et al.*, "Rapport collectif" (1950), pp. 69-71.

[116] Abel, *Die Wüstungen des* . . . (1955).

[117] See, for example, Utterström, "Climatic fluctuations and population . . ." (1955); see also Le Roy Ladurie, "Climat et récoltes . . ." (1960), pp. 458-465, and his "Histoire et climat" (1959).

[118] The work of Graunt and his followers, who introduced quantitative research methods, named "political arithmetic", in estimating population numbers, is discussed in chapter III, section B.

[119] See Willcox, "Increase in the population . . ." (1931), vol. 2, pp. 44-49, for a brief evaluation of this and other contemporary estimates for the world.

[120] For a brief account of early censuses, see Wolfe, "Population censuses before 1790" (1932).

[121] An examination of official population records beginning 1368 is discussed in Ho, *Studies on the Population* . . . (1959), pp. 3-100. Perhaps the most comprehensive record, the *Pao-chia* of the Ch'ing dynasty (1644-1912), is described in detail by Hsiao, "Rural control in nineteenth century China" (1953).

TABLE II.4. VARIOUS ESTIMATES OF POPULATION OF THE WORLD AND MAJOR REGIONS, 1750-1965

Regions and sources of data	*Estimated population (millions)*					
	1750	*1800*	*1850*	*1900*	*1950*	*1965*
World					2,486	3,289
Carr-Saunders	728	906	1,171	1,608		
Willcox	694	919	1,091	1,571		
Durand—variants:						
Medium	791	978	1,262	1,650		
(Low-high)	(629-961)	(813-1,125)	(1,128-1,402)	(1,550-1,762)		
Africa					217	303
Carr-Saunders	95	90	95	120		
Willcox	100	100	100	141		
Durand—variants:						
Medium	106	107	111	133		
(Low-high)	(60-153)	(69-142)	(81-145)	(115-154)		
Asia (excluding Asiatic USSR)[a]					1,355	1,833
Carr-Saunders	475	597	741	915		
Willcox	437	595	656	857		
Durand—variants:						
Medium	498	630	801	925		
(Low-high)	(408-595)	(524-721)	(711-893)	(853-1,006)		
Latin America[b]					162	246
Carr-Saunders	11	19	33	63		
Willcox	10	23	33	63		
Durand—variants:						
Medium	16	24	38	74		
(Low-high)	(12-20)	(20-29)	(34-42)	(71-78)		
Northern America[c]					166	214
Carr-Saunders	1	6	26	81		
Willcox	1	6	26	81		
Durand—variants:						
Medium	2	7	26	82		
(Low-high)	(2-3)	(6-7)	(26)	(82)		
Europe (including USSR)[a]					572	675
Carr-Saunders	144	192	274	423	—	—
Willcox	144	193	274	423	—	—
Durand—variants:						
Medium	167	208	284	430		
(Low-high)	(146-187)	(193-223)	(274-293)[d]	(423-436)[d]		
(USSR)					(180)	(231)
Carr-Saunders	(. . .)	(. . .)	(. . .)	(. . .)		
Willcox	(. . .)	(. . .)	(. . .)	(. . .)		
Durand—variants:						
Medium	(42)	(56)	(76)	(134)		
(Low-high)	(31-52)	(46-66)	(66-85)	(127-140)		
Oceania					13	18
Carr-Saunders	2	2	2	6		
Willcox	2	2	2	6		
Durand	2	2	2	6		

SOURCES: Carr-Saunders, *World Population* . . . (1936), p. 42. Willcox, *Studies in American Demography* (1940), p. 45; estimates for America have been divided between northern America and Latin America by means of detailed figures presented on pp. 37-44. Durand, "The modern expansion . . ." (1967), p. 137. Estimates for 1950 and 1965 from United Nations, *World Population Prospects as assessed in 1968* . . .

Note: Because of rounding, the sum of the parts does not exactly equal the total shown in all cases.

[a] Estimates for Asia and Europe in Carr-Saunders' and Willcox's series have been adjusted to include the population of the Asiatic USSR with that of Europe rather than Asia. For this purpose, the following approximate estimates of the population of the Asiatic USSR were used: 1750, 4 million; 1800, 5 million; 1850, 8 million; 1900, 22 million. Durand's estimates for USSR only are shown.

[b] Latin America is distinguished from northern America at the southern border of the United States and comprises Middle America, South America and the Caribbean Islands.

[c] United States, Canada, St. Pierre and Miquelon.

[d] Range exists in USSR component only, shown separately below.

population, but in 1872 effective registration was instituted by the Meiji régime. Reliable censuses date from 1920.[122]

55. To the present time there are large regions of the world where development of demographic statistics has scarcely begun. Demographic historians are uncovering and interpreting an increasing amount of information that gives new insights into population movements throughout the modern period. Nevertheless there remain large gaps that can never be filled, but only bridged by improved conjectures. The estimates prepared by Willcox and by Carr-Saunders for the world and its major regions for the period 1650 to 1900 have received wide acceptance from the time of their first publication in the 1930s,[123] but a reassessment of growth trends has now become profitable. Results of the most recently published study to date[124] are presented with the Willcox and Carr-Saunders estimates in table II.4 for fifty-year intervals from 1750 to 1900.

56. Working back to 1650, Willcox arrived at 470 million and Carr-Saunders 545 million for the total population of the world, and deductions of both authors for the century following imply a net growth rate of three per thousand.

57. A quickening of this modest rate was apparent for the period 1750-1900. Medium estimates for the latest series given in table II.4 furnish a convenient reference point as centres of ranges of low and high variants "... not intended to define absolute limits, but to indicate the width of estimated ranges of relative plausibility without excluding the possibility that the true numbers might have been outside these ranges".[125] It may be observed that estimates in the two earlier series fall within the ranges outlined in the later series in nearly all cases, and when outside it is to a negligible degree. These recent estimates show upward revisions for all regions except Africa in 1900 and Oceania.

58. The magnitude of Asia's population, roughly about two thirds of the world total until 1850, after which it was closer to half, make the disparity in estimates for that region more significant. The principal reason for the variations in Asia is the different evaluations of the conflicting evidence with respect to the population of China. Totals for this country, as a component of the medium estimates for Asia given in table II.4, comprised approximately one quarter of the world total in 1750 and 1900 and one third in 1800 and 1850.[126] Willcox, after examining various Chinese sources and making certain allowances, reached totals for 1650 and 1900 between which he interpolated his series, assuming a constant rate of growth during 1650-1850.[127] Carr-Saunders accepted higher estimates for 1650 and 1900 and then pursued the same method.[128] Durand's estimates for China's population prior to 1900 were based on official sources rejected by both Willcox and Carr-Saunders, while for 1900 he had the 1953 census total on which to base a backward projection at an assumed rate of growth.[129]

59. For Africa, Carr-Saunders made an allowance in his 1850 and earlier estimates for the presumed depopulating effect of the slave trade, while Willcox apparently considered the continental total too uncertain to warrant any change in the estimates until 1900, when he accepted a figure which represented substantial growth. For Africa south of the Sahara, where a foundation for calculations is almost totally lacking, Durand's hypothesis concurred in this pattern of growth, but at a lower level. Wider acquaintance with North Africa recommended its separate treatment; totals for 1750-1900 were obtained by backward extrapolation from a United Nations estimate for 1920.[130]

60. The population enumerations and registration of births and deaths carried out in many parts of Latin America from the colonial period onward had many deficiencies, and recent studies as well as improved population statistics have indicated that too great dependence on these records have produced estimates believed to be considerably understated.[131] Thus, the low variant of the most recent series given in table II.4 somewhat exceeds the estimates of the two earlier series.

61. The closer accord of population estimates for the remaining areas of European settlement is a reflection of the progressive reliability of their statistical data during the period here considered. Carr-Saunders accepted the results of Willcox's thorough examination of the work of scholars concerned with the number of inhabitants of modern Europe.[132] Subsequent advances in this field of investigation have led to estimates which consistently equate the earlier estimates with the low variant shown in table II.4. Upward revision was deemed appropriate for the USSR, as well. When Europe excluding the USSR is considered, the range of plausible estimates narrows appreciably in 1800 and is non-existent thereafter.

62. Emigration from Europe to the New World, beginning modestly in the sixteenth century and swelling

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[122] An Imperial decree in A.D. 645, ordering that a census be taken every six years, was followed for about 150 years. Censuses taken in the Tokugawa period excluded large segments of the population and required substantial adjustment for later students to reach approximations of the country's total. Ishii, *Population Pressure* ... (1937), pp. 2, 5-8, 48-56.

[123] Willcox, *Studies in American Demography* (1940), pp. 22-51; these are revisions of previous estimates, published in his "Increase in the population ..." (1931), pp. 33-82; Carr-Saunders, *World Population* ... (1936), p. 42 (for 1650-1933).

[124] Durand, "The modern expansion ..." (1967), pp. 137-138.

[125] *Ibid.*, p. 136.

[126] Medium estimates for China at fifty-year intervals 1750-1950 are (in millions): 200, 323, 430, 436 and 560, *ibid.*, p. 137.

[127] Willcox, *Studies in American Demography* (1940), pp. 35, 48, 532; a thorough discussion of the author's approach to estimating the population of China is given in appendix II, pp. 511-540. It is now apparent that the total for 1650 was based on a misapprehension of the source of the data. Willcox believed it to relate to a count of households when in fact it was concerned with a customary tax assessment which had grown out of an imposition of compulsory labour service on most adult males at an earlier period. See Ho, *Studies on the Population* ... (1959), pp. 24-35.

[128] Carr-Saunders, *World Population* ... (1936), pp. 40-41.

[129] Durand, "The modern expansion ..." (1967), pp. 147-148.

[130] *Ibid.*, pp. 152-153.

[131] *Ibid.*, p. 156. The author cites, in particular, Castro, "El desarrollo de la población ..." (1959), pp. 425-443.

[132] Willcox, *Studies in American Demography* (1940), pp. 22-51, includes comprehensive references to sources.

to large proportions at the beginning of the twentieth century, profoundly altered the map of world population distribution. In spite of the magnitude of the exodus, however, Europe excluding the USSR steadily maintained around 16 per cent of the world's total population as estimated at fifty-year intervals from 1750 to 1950. The principal areas in which the European emigrants settled, the Americas, the Asian part of the Russian Empire and Oceania, experienced rapid growth of population, due to the high rates of natural increase among the migrants and their descendants as well as to the immigration itself. The proportion of the world's total population in areas of European settlement increased from about 24 per cent in 1750 to 28 per cent one hundred years later and to 36 per cent in 1900 and 1950.

63. The movement of Europeans to Africa and Asia has been small relative to the total population, and has been nearly balanced by the migrations of Africans and Asians to the European cultural sphere. The importation of African slaves, it should be noted, added considerably to the population of the Americas until 1850.

64. Incidental to the transfer of populations was the cultural diffusion which modified customary patterns of living. In modern times, improved communications permit on an expanding scale the spread of some factors affecting population trends which was formerly accomplished at a much slower pace by migrations.

1. EUROPE

65. In addition to the scattered first attempts at census-taking in the eighteenth and early nineteenth centuries, there were some accountings of the populace for fiscal and administrative purposes covering smaller territories and in cities. These sources, reinforced by deductions from known economic and other related conditions gave the principal indication of population sizes. Ecclesiastical registers of baptisms, marriages and burials have also been a valuable source for demographic analysis, especially when associated with epidemics, crop failures, wars and other historical events.[133] Detailed analyses of fertility and mortality levels have been made from the reconstitution of families over several generations from local parish records by French historical demographers, and similar studies for social classes from the beginning of the sixteenth century have added to this body of knowledge.[134] The development of civil registration on a national scale had its inception in this period, but because of deficiencies, data from this source, for some countries until fairly recently, are subject to many adjustments and interpretations.[135]

66. During the course of the seventeenth century, Europe had endured a series of disasters—severe cold, crop failures and famine, rebellions and wars, of which the Thirty Years War was one of the most devastating in history. Perhaps the greatest scourge was the Plague, which entirely ceased only in the early part of the eighteenth century. These afflictions did not appear simultaneously nor to the same extent in all areas. Where there was growth in some regions, it was offset by loss in others, so that conclusions as to stagnation in the trend of total European population would seem reasonable.

67. From the beginning of the eighteenth century, there was an amelioration of conditions formerly marked by calamities. As seen by some, at this point domination by nature was modified by increasing and more deliberate control of man over his circumstances, and a period of economic and demographic growth began.[136] Although from country to country the turning point varied, the upward demographic trend was general in most parts of Europe and was to continue at an accelerating rate into the twentieth century. Its initiation is frequently credited to lowered death rates, resulting chiefly from a lessening of peaks of mortality. The disappearance of the Plague from Western Europe, after a final brief outbreak in Provence in 1720, is widely credited with furthering this advance.[137] Increased colonization and expansion of arable land in Eastern and Northern Europe and the beginning of the Industrial Revolution, first in England about 1750[138] and next in other countries of Western Europe, were also major contributory factors. Various opinions as to the effects of the Industrial Revolution on population growth are discussed below.

68. Laslett's careful investigations of conditions in England on the eve of the Industrial Revolution led him to agree with Gregory King's estimate of average expectation of life at birth for both sexes as 32 for England at the end of the seventeenth century.[139] The analysis of parish records by several scholars has given an indication

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[133] See, for example, Mols, "Introduction à la démographie . . ." (1954); Meuvret, "Les crises de subsistance . . ." (1946); and Eversley, "A survey of population . . ." (1957).

[134] See, for example, Fleury and Henry, *Des registres paroissiaux* . . . (1956); Gautier and Henry, *La population de Crulai* . . . (1958); and Goubert, *Beauvais et le Beauvaisis* . . . (1960); Hollingsworth, "The demography of the British peerage" (1964), pp. 29-70; Peller, "Births and deaths among Europe's . . ." (1965), pp. 87-100.

[135] Methods for the use of early civil and parish registers as maintained in France are given by Fleury and Henry in *Nouveau manuel de dépouillement* . . . (1965), superseding their earlier *Des registres paroissiaux* . . . (1956). For studies of population trends in various parts of Europe based on parish registers, early censuses and other types of demographic records, see Société de démographie historique, *Annales de démographie historique, 1965* . . . (1966); ———, *1966* . . . (1967).

[136] Reinhard, Armengaud and Dupaquier, *Histoire générale* . . . (1968), pp. 197-198.

[137] Helleiner, "The vital revolution reconsidered" (1965), pp. 85-86. ". . . perhaps only a society freed from the fear as well as from the material and spiritual consequences of sudden death was able to achieve that high rate of intellectual and technical progress without which population growth could never have been sustained", p. 86.

[138] Although 1750 is generally accepted as marking the advance appearance of the Industrial Revolution, Ashworth states: "It would be truer to say that between 1760 and 1830 many of the essential foundations of an industrial revolution were laid in Great Britain, and that on a very limited part of them a notable structure was erected; but a very large part of the building was left for completion later." *A Short History of the International Economy* . . . (1952), p. 19.

[139] Laslett, *The World We Have Lost* (1965), p. 93.

TABLE II.5. EXPECTATION OF LIFE AT BIRTH (YEARS), BASED ON GENERATION LIFE TABLES

Sources of data	*Period of birth and expectation of life (years)*									
	Seventeenth century		*Eighteenth century*				*Nineteenth century*			
Family reconstitution										
Genevan *bourgeoisie*	1600–1649	1650–1699	1700–1749		1750–1799			1800–1850	1850–1899	
Males	30	32	40		46			52	59	
Females	35	39	46		50			53	67	
Peerage	1650–1674	1675–1699	1700–1724	1725–1749	1750–1774	1775–1799	1800–1824	1825–1849	1850–1874	
Males	30	33	34	39	45	47	49	52	55	
Females	33	34	36	37	46	49	52	58	63	
Ruling families ..	1600–1699			1700–1799				1800–1849		
Males	28			36				52		
Females	34			37				53		
Local populations										
Broek-in-Waterland			1654–1732							
Both sexes			23							
Crulai			1675–1775							
Both sexes			30							
National tables										
England and Wales			1750	1780			1800	1820	1840	1860
Males			...	...			...	...	39.5	42.8
Females			...	...			...	...	42.7	46.5
France										
Males			...	...			...	39.4	38.2	40.4
Females			...	...			...	41.0	41.3	42.7
Netherlands										
Males			...	...			...	...	38.0	40.1
Females			...	...			...	...	39.9	42.9
Sweden					1791–1815					
Males			33.5	34.1	36.3		37.2	41.4	44.3	46.6
Females			36.7	41.8	38.4		40.8	45.3	47.9	49.5

SOURCES: These data were compiled by Glass and Eversley *eds.*, *Population in History* ... (1965), p. 21, from the following sources: Henry, *Anciennes familles genevoises* ... (1956); Hollingsworth, "The demography of the British peerage" (1964); Peller, "Births and deaths among Europe's ..." (1965); Struyck, *Les œuvres* ... (1912); Gautier and Henry, *La population de Crulai* ... (1958); Delaporte, *Evolution de la mortalité en Europe* ... (1941).

of the progress in extending the life span in succeeding years. While these data, summarized in table II.5 relate to a favoured segment of society, they nevertheless signify a general trend.

69. Where population expanded in an agricultural economy, it is probable that accelerated growth was also due to early marriage and high fertility (as was the case in North America in similar circumstances) as well as less prominent peaks of mortality. The growth of population associated with the rise of manufacturing industry may similarly have been induced by increased economic opportunity and early marriage. This interpretation of the interaction in the process of industrialization of long-term growth in both population and output interjects a modification in the general view that lowered mortality gave the primary impetus to an upsurge in numbers. In the case of Britain, it has been conjectured that for the period beginning with the 1740s, provision for the increasing population derived from growth in output forestalled a rise in the death rate; growth in population, augmenting the labour force, permitted the pace of industrial development to keep its momentum, and the accompanying rise in demand and prices was an incentive to expansion and innovation. Greater employment opportunities then encouraged family formation at earlier ages.[140]

70. The sequence of first accelerating, then declining rates of population increase in Europe is explained by the relative timing of the declines in both birth and death rates during the modern era. The sustained excess of births over deaths which had apparently become normal in Europe during the eighteenth century produced moderate population increases over fairly long periods of time in spite of short-term fluctuations in periods of economic prosperity or adversity. This excess was augmented during the nineteenth century as mortality rates dropped while birth rates generally remained high. The downward trend in the birth rate evident by the latter part of the nineteenth century was nevertheless outpaced by falling death rates. Growth was steady, from an estimated average rate of 6.2 per thousand for 1851-1860 to

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[140] Deane, *The First Industrial Revolution* (1965), p. 34.

9.9 for 1891-1900,[141] and persisted in the first years of the twentieth century in spite of the swelling stream of overseas emigration.[142] Subsequently, death rates continued on their downward slope, but the fall in European birth rates quickened, with the result that population growth became slower.[143]

71. This pattern is illustrative of the demographic transition from high to low mortality and fertility, in both instances nearly in balance and permitting only slow population growth, if any. In its classic progression, the first stage produced rapid population increase as mortality declined while fertility remained high. In the second stage, the onset of fertility decline accompanied a continued lessening of mortality, but the age-structure established by the first stage was still favourable to high birth rates and a continuation of marked expansion. The transition was completed in the third stage, with birth rates nearer a low level of death rates.

72. The earliest reliable vital statistics for any region have made it possible to trace this transition in the demographic history of the Northern European countries since 1735.[144] During the greater part of the eighteenth century, there were wide fluctuations and great variation among areas, but the long-term trend was one of moderate growth. Trends for this and following centuries are given in table II.6 below. Fertility may have been somewhat lower than the prevailing level in Western Europe, possibly influenced by marriage patterns and some attempt at limitation. From the second half of the century, a slight lowering in the birth rate is indicated. A brief period of higher rates around the middle of the nineteenth century was followed by uninterrupted decline. Mortality rates also seemed to be relatively low at the beginning of the eighteenth century, showed some increase, and between 1750 and 1790 appeared nearly stationary, after which a marked descent continued into the next century. Overseas emigration from Scandinavia became important after the middle of the nineteenth century, but the upward movement of natural increase, begun about 1800 and continuing until the last quarter of the century, had a somewhat stabilizing effect on fluctuations in the growth rate.[145] Thereafter, the fall was more rapid for births than for deaths, and decline continued into the twentieth century. Average annual increase rates per thousand for ten-year periods beginning 1850 were 11, 7, 8, 11 and for 1901-1905, 8. For 1931-1940, these rates were: Sweden, 3; Norway, 5; Denmark, 7; Finland, 7.

TABLE II.6. AVERAGE ANNUAL RATE OF POPULATION GROWTH (PER THOUSAND) IN NORTHERN EUROPEAN COUNTRIES

Period	*Sweden*	*Norway*	*Denmark*	*Finland*
1735-1800	5	7	3	12
1801-1900	7	9	9	11
1901-1940	6	7	11	9

SOURCE: Gille, "The demographic history . . ." (1949), p. 38.

73. Thus, the modern demographic transition appears to have been first set in motion in Scandinavia and Northern and Western Europe, where there was a general lowering of mortality throughout the nineteenth century, while fertility remained high until the last quarter. England's experience differed somewhat from that of the other countries in that the beginning of sustained population growth is placed at about 1750, concurrent with its modern economic growth. That the downward trend of births began in the last quarter of the nineteenth century appears indisputable, but whether rising fertility or falling mortality determined population increase in the initial stage of the transition is widely discussed.

74. Several scholars have investigated the quality of the data used to calculate birth and death rates prior to the beginning of civil registration in England in 1837.[146] One of these scholars found little significant change in mortality between 1700 and 1821 and terms indications of its fall after 1780 a "statistical mirage". He favours rising fertility from more and earlier marriages, beginning about 1755, as decisive in the expansion of early nineteenth century population.[147] The rise in birth rates from earlier marriage is seen as sustained by improved economic conditions by Habakkuk;[148] others doubt that the drop in age at marriage was sufficient to affect fertility trends substantially. They argue that population increase resulted mainly from reduced death rates, because of improved economic and social conditions rather than advances in therapeutic medicine.[149] This counters a conclusion that medical advances independent of the effect of the Industrial Revolution on the standard of living explain population growth in the mid-eighteenth century.[150]

75. The two most noteworthy exceptions to the general pattern were France and Ireland. The rate of population

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[141] Habakkuk and Postan, *eds., The Cambridge Economic . . .*, vol. 6 (1965), p. 62.

[142] For the first decades of the twentieth century, a time lag of one or two generations is noted in the decrease in births and deaths from West to East, *via* North and Central Europe, with the First World War having only a temporary effect. Frumkin, *Population Changes in Europe . . .* (1951), p. 13.

[143] The statement of the sequence of events represents the consensus of a number of authors who have examined the available evidence on European population trends during the period in question. See, for example, Carr-Saunders, *World Population . . .* (1936), p. 62. See also Habakkuk and Postan, *eds., The Cambridge Economic . . .*, vol. 6 (1965), pp. 68-69, and Borrie, *Population Trends and Policies . . .* (1948), p. 9, for birth and death rates in European countries.

[144] Gille, "The demographic history . . ." (1949), pp. 18-65.

[145] With reference to Sweden, see Thomas, *Social and Economic Aspects . . .* (1941), p. 10. Net reproduction rates in the nineteenth century have been computed by Depoid, "Evolution de la reproduction . . ." (1941), p. 219; for single years beginning 1751, see Hyrenius, "Reproduction and replacement" (1951), p. 424.

[146] Glass, "Population and population movements . . ." (1965), pp. 221-246, who also considers the earlier work of Rickman, Farr, Brownlee and Griffith.

[147] Krause, "English population movements . . ." (1963), pp. 588-589.

[148] Habakkuk, "English population . . ." (1953), pp. 117-133, and his "The economic history of modern Britain" (1958), pp. 486-501.

[149] McKeown and Brown, "Medical evidence related . . ." (1955); McKeown and Record, "Reasons for the decline . . ." (1962).

[150] Razzell, "Population change . . ." (1965), pp. 312-331. See also Langer, "Europe's initial population explosion" (1963), pp. 4-7.

growth in France, never high in modern times, declined in the nineteenth century from an average of about 5 per thousand for the first two decades.[151] The rate of natural increase, at a similar level at the beginning of the century, fluctuated from mid-century in a steadily declining trend to about zero at the end of the century, followed by a brief increase and then decline for the years before the First World War.[152] This downward trend was attributable to the early decline in fertility which started around the time of the French Revolution, possibly earlier.[153] Genealogies of the French aristocracy reveal that limitation of family size in that group, presumed to have begun in the seventeenth century, led to a sharp drop in marital fertility in the eighteenth. Low net reproduction rates fell further to 1 by 1850, indicating that fertility was barely adequate for replacement. The rate remained below 1 in the last few years of the century and the first half of the twentieth.[154] Regional variations were pronounced, however, and fertility remained high in industrial and very remote areas. Mortality gradually and slowly reached lower levels.

76. In Ireland, the population grew at rates comparable to those of England and Wales between 1780 and the Great Famine of 1846-1847, by which time it had reached about 8 million.[155] The population of the Republic of Ireland in 1861 was 4.4 million; by 1925, it had fallen below 3 million, and has never recovered. The early decrease has been attributed primarly to the effect of the potato famine, which caused excess deaths and stimulated out-migration (see chapter VII, sections A and B). In addition, however, the rate of natural increase was held to a low level by delayed marriage and consequent low fertility.[156]

77. The period of most rapid growth apparently was reached in France and Ireland during the early part of the nineteenth century, in England in the 1870s, in Scandinavia in the 1870s and 1880s and in Germany during the 1890s and 1900s.[157] In Germany, from the middle of the nineteenth century rapid growth was associated with both industrialization in the west and continuing colonization in the east. According to a study of Northern and Western Europe in the second half of the nineteenth century, net reproduction rates in Prussian agricultural areas were found to be on about the same level with those in industrial areas.[158] This contrasts with the situation in France, where reproduction rates in most rural sectors were rather low.

78. The cycle of rising and falling rates of population increase developed later in Southern and Eastern than it did in Northern and Western Europe, with the period of most growth postponed in various parts until the first, second or third decade of the twentieth century.[159] In Eastern Europe, not including the Soviet Union, the rates of population growth were higher than the general European average throughout the nineteenth century. In the first decade of the twentieth century, crude birth and death rates around 35-40 and 25, respectively, sharply distinguished the countries of this area from Western Europe.[160]

2. USSR

79. The only population census in the Russian Empire was taken in 1897, from which has been derived an officially estimated total of 125 million for the present area of the Soviet Union. Taking into account questions of accuracy and adjustments for coverage, the medium estimate of 134 million lies within a range of 127 to 140 million for 1900 (see table II.4). Estimates for the eighteenth and nineteenth centuries are based on enumeration of taxable males and are difficult to interpret for purposes of comparison.[161] Nevertheless, growth rates above those for Europe appear to have been maintained throughout the past 200 hundred years in spite of severe cut-backs at the time of the First World War and a net loss during the Second.

80. The eighteenth century and early years of the nineteenth were marked by a number of wars, followed by relative peace until the Crimean War in 1853-1856. Perhaps the most significant events of the latter half of the century were the abolition of serfdom, accompanying agrarian reform and gradual expansion, and the beginnings of industrial development. Crude birth rates around 50 in European Russia for 1861-1900, declining to about 43 in 1913, were obtained from registers maintained by the Orthodox Church. The death-rate decline was more rapid, from about 37 to 27; the highest rate of natural increase during the period was 17.6 for 1911.[162] After

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[151] Landry, *Traité de démographie* (1949), p. 57.

[152] Bourgeois-Pichat, "Note sur l'évolution générale de la population française ..." (1952), p. 329.

[153] Levy and Henry, "Ducs et pairs ..." (1960), pp. 815-819. For a study of a similar phenomenon in the Genevan *bourgeoisie*, see Henry, *Anciennes familles genevoises* ... (1956), pp. 75-110. In the British aristocracy, on the other hand, marital fertility, noted as exceptionally high beginning about 1760, prevailed at that level for the next hundred years or so; unmistakable decline set in about the middle of the nineteenth century. See Hollingsworth, "A demographic study of the British ..." (1957), pp. 15-22.

[154] Bourgeois-Pichat, "Note sur l'évolution ..." (1952), p. 329.

[155] Connell, *The Population of Ireland* ... (1950), pp. 24-25.

[156] Thompson and Lewis, *Population Problems* (1965), pp. 493-494; Ireland, Department of Industry and Commerce, *Statistical Abstract, 1946* (1947), p. 12; Arensberg, *The Irish Countryman* (1937), pp. 94-99; Aalen, "A review of recent Irish ..." (1963), p. 75.

[157] Landry, *Traité de démographie* (1949), pp. 177-179; see also Glass, *Population Policies and Movements in Europe* (1940), pp. 28, 270; and his "Changes in fertility in England ..." (1938), p. 168. In the Netherlands, growth at a high rate continued longer than in neighbouring countries; a peak about 15 per thousand was attained in 1900-1913 and again in 1921-1925.

[158] Wrigley, *Industrial Growth* ... (1961), pp. 160-162.

[159] Borrie, *Population Trends and Policies* ... (1948), pp. 8-10.

[160] Chasteland, "La population des démocraties ..." (1958), p. 80. Rates at this level of mortality occurred in England and France at the beginning of the nineteenth century; similar natality rates about 1810 in England and 1780 in France. See also Kirk, *Europe's Population* ... (1946); and Notestein *et al.*, *The Future Population* ... (1944).

[161] For estimates and growth rates, see Urlanis, *Rost naseleniia v SSSR* (1966), pp. 9, 15, 17-18. See also Gordon, "Russia's growing population" (1945); Lorimer, *The Population of the Soviet Union* ... (1946), p. 169; and Sundbarg, *Aperçus statistiques internationaux* (1908). Biraben, "Essai sur l'évolution ..." (1958), pp. 29-62, estimates the population for the years 1861-1957.

[162] Rashin, *Naselenie Rossii za 100 let* (1956), pp. 150-152, 154-156.

TABLE II.7. RUSSIA: AVERAGE ANNUAL RATES OF POPULATION INCREASE, 1867-1895

Period	Rates of increase (per cent)
1867-1870	1.2
1871-1875	1.4
1876-1880	1.3
1881-1885	1.4
1886-1890	1.5
1891-1895	1.3

SOURCE: Urlanis, *Rost naseleniia v SSSR* (1966), p. 15.

drastic decline during the First World War, the birth rate gradually rose to a peak of 45 in 1927 for the USSR.[163] Thereupon, with greatly increased industrialization and urbanization, steady decline was established. A decline in the rate of growth, from 11 per thousand in the 1920s to 9 in the 1930s, was markedly reversed after the Second World War; a rate of 17 was registered for the 1950s.[164]

3. NORTH AMERICA

81. The spectacular growth of North American population after initial settlement by the Europeans was not due primarily to immigration. In that region of almost limitless frontiers, marriage was early and universal and marital fertility extremely high. In Canada, church registration records provide reliable data on population movements in the seventeenth and early eighteenth centuries. The inhabitants of European descent numbered 17 in 1611. By 1763, when Canada was transferred from French to British Government, the total had grown to about 65,000 from an estimated 10,000 original settlers (some of whom located in what is now the north-eastern United States).[165] The first of a series of decennial censuses gave a total of over 2.4 million in 1851, less than 150,000 being of non-European origin. One hundred years later, at 14 million, the population had multiplied more than fivefold. External migration has been a prominent feature of Canadian population history, with heavy in-migration countered somewhat by return-migration and by a gravitation to the United States (see chapter VII, section C). The French Canadian segment, little affected by migration since 1671, has retained its cultural homogeneity to an unusual degree. Despite the heavy volume of in-migration elsewhere, the proportion of Canada's total population in the Province of Quebec has fallen only from 37 per cent in the middle of the nineteenth century to slightly under 30 per cent during the present century.[166] Its increase has come from birth rates among the highest in the world in earlier times.[167] With reference to the eighteenth century, Henripin has calculated a net reproduction rate of 1.93, amounting to a doubling of the population every thirty years.[168] In recent years, the crude birth rate has exceeded that of any of the more developed countries.[169]

82. The trend of population growth in the United States during the nineteenth century differed from that in Western Europe in three major respects: (*a*) the rate of natural increase at the beginning of the century was much higher in the United States than in Western Europe; (*b*) the rate of natural increase declined throughout the century (in contrast to the rising rate in most European countries) because of a steady decline of the birth rate beginning much earlier than in most areas of Europe. The estimated annual numbers of births per thousand women 15 to 44 years old in the United States during the first three decades of the nineteenth century averaged 276, 267 and 250, respectively; they dropped to 208 in 1840-1850, 146 in 1880-1890, and 100 in 1920-1930;[170] (*c*) heavy immigration prevented a corresponding drop in the rate of total population growth during the first half of the nineteenth century; the population increased between 33-36 per cent in each decade 1790-1860. From 1860 until the outbreak of the First World War, the rate of growth decreased in spite of an increasing volume of immigration. After the First World War, the birth rate and the volume of immigration continued to decrease and the average annual rate of growth declined to 0.7 per cent in the decade 1930-1940 which included years of severe economic depression.[171] This rate climbed further to its highest level in fifty years, 1.6 for the periods 1945-1950 and 1950-1960, ascribable largely to the high birth rate customary in post-war years and to a decided trend in child-bearing at earlier ages. Canadian rates of growth followed a similar course, although markedly higher. Under the impact of heavy immigration, the Canadian peak in the same fifty-year period was 2.8 for 1951-1956, followed by a rate of 2.5 per cent for 1956-1961.[172]

4. LATIN AMERICA

83. The beginning of the modern age registered a low point in the population history of Latin America. During the first 175 years of colonization, the hardihood of European settlers and African slaves was insufficient to

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[163] Urlanis, "Dynamics of the birth rate ..." (1967), p. 232.

[164] United Nations, *Demographic Yearbook, 1960* ... (1961), p. 118, USSR, Tsentralnoe Statisticheskoe Upravlenie, *Narodnoe Khoziaistvo SSSR* ... (1968), pp. 7, 36.

[165] Lower, "The growth of population in Canada" (1962), p. 45.

[166] Canada, Dominion Bureau of Statistics, *Eighth Census of Canada, 1941* (1945), vol. 1, pp. 4-5. The percentage of French origin in all of Canada has remained around 30 per cent for the past 100 years. Biraben, "Le peuplement du Canada français" (1967), p. 137.

[167] Kuczynski, *Birth Registration and* ... (1930), pp. 199-200. According to an analysis of the Roman Catholic population of Quebec, preponderant in that Province, the crude birth rate was generally in the 50s in the eighteenth century. Thereafter, decennial averages were in the 40s until a rate of 39 was obtained for 1921-1925 (34 for 1926-1928).

[168] Henripin, *La population canadienne* ... (1954), p. 74.

[169] Crude birth rates of 30 are given for 1946-1950 and 1951-1955, and of 26 in 1961-1965. Canada, Dominion Bureau of Statistics, *Canada Year Book, 1963-64* (1964), p. 220.

[170] Thompson and Whelpton, *Population Trends in the United States* (1933), p. 310.

[171] United States, Bureau of the Census, *Statistical Abstract* ... (1946), pp. 4, 71.

[172] United Nations, *Demographic Yearbook, 1962* ... (1963), p. 264; ——————, *1964* ... (1965), p. 158.

compensate for the drastic depletion in the sixteenth century of the indigenous population and there was general decline.[173] A fairly stabilized demographic situation is believed to have prevailed during most of the remainder of the colonial period. Increases thereafter produced a steadlily rising trend in pronounced contrast to the more precipitous downward inclination for North America, as can be seen in table II.8.

84. Growth of the Indian population apparently resumed slowly, estimated by Rosenblat (in millions) at 2.6 in 1825, 13.5 in 1940 and 14.9 in 1950.[174] European immigration and concomitant natural increase contributed substantially to this growth in many countries, notably in Argentina. The importation of African slaves, continuing until the middle of the last century in places, also swelled the numbers of inhabitants.[175] Brazil's population, according to one estimate, doubled between 1800-1850, increased by 149 per cent in 1850-1900 and by 189 per cent in the next fifty years.[176]

85. Among the major regions, Middle and South America currently appear to have the fastest rate of population growth in the world. Separate estimates at fifty-year intervals prepared for four component areas show that Brazil's high growth trend has been pre-eminent during the entire period 1750-1950, slightly exceeding the pace in the Caribbean. Growth elsewhere has been relatively moderate, with Mexico increasing more slowly than the remainder of Latin America.[177]

86. A continuation of very high fertility in nearly all Latin American countries appears from a tabulation of natality rates for the periods 1945-1950 and 1955-1960. Exceptions are Argentina and Uruguay, where crude birth rates are in the low 20s, Cuba in the low 30s and Chile slightly higher.[178] Puerto Rico's rates have also fallen below 30 in recent years (see also chapter IV, table IV.6). The downward trend in mortality, which is expected to continue for some time, will further inflate the already high rates of natural increase unless accompanied by lowered fertility. Rates of natural increase around 35 in the mid-1960s are reliably reported for Costa Rica, El Salvador and Mexico,[179] while estimates for several other countries for 1959-1961 range from around 22, as in the case of Bolivia, where mortality appears to be particularly high, to 35 or above, of which Venezuela is an example.[180] For the region as a whole, there has been a doubling of the population in the thirty years from 1932 to 1962, when it reached an estimated total of 216 million.[181]

5. OCEANIA

87. Extremely high rates of both total and natural increase occurred in Australia and New Zealand in the third quarter of the nineteenth century, due in part to the influence of contemporary immigration and the resulting abnormal age structure of the population. Beginning in the late nineteenth century and through the 1930s, these countries experienced some decline in natural increase resulting from lowered fertility. The years following the Second World War have seen a recovery, as in the case of New Zealand, to a level approximating that of the early years of this century. A level of fertility higher than for most countries of western Europe has been retained while death rates have further decreased from a comparatively low level. With the exception of the war years, immigration has continued on a substantial scale.[182] Since the end of the Second World War, intercensal average rates of increase have ranged from 2.1 to 2.4 per cent *per annum.*[183]

6. ASIA

88. The outline of Asian demographic history is defined by that of China, India and Pakistan, which in 1965 accounted for 70 per cent of Asian population, and 40 per cent of that of the world. Beginning about the second quarter, the seventeenth century in China was a period of political and economic dislocation and great peasant rebellions. These wars in their destructive effects have been compared to the Thirty Years War in Europe.[184] After the overthrow of the Ming dynasty in 1644, the new Ch'ing Empire was consolidated only after further warfare, but sometime around 1700 the population may have approximately regained the size it had in 1600, about 150 million. Economic evidence as well as estimates derived from incomplete enumerations and registrations indicate that a period of sustained growth then began which continued into the nineteenth century. Totals have been suggested of 200 million for 1750, 323 million for 1800 and 430 million for 1850. Over the span of this period, therefore, it is likely that the number of inhabitants at least doubled. The rate of growth is conceived of as having slackened in the first half of the nineteenth century.[185] The remainder of the century was marked by the

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[173] Davis, "The place of Latin America . . ." (1964), p. 22.

[174] Rosenblat, *La población indígena* . . . (1954), p. 122.

[175] Brazil's slave population has been put at 1 million in 1800, and about 1.5 million in 1860, according to Furtado, *The Economic Growth of Brazil* . . . (1963), p. 127. Starting at the same figure in 1800 as Brazil, the slave population in the United States reached about 4 million, largely through natural increase. Poor diet and more intensive labour contributed to high slave mortality in Brazil, where deaths far exceeded births. This sector therefore was replenished continually by fresh imports. *Ibid.*, p. 129.

[176] Mortara, "The development and structure . . ." (1954), p. 122.

[177] Durand, "The modern expansion . . ." (1967), pp. 156-158.

[178] United Nations, *Boletín económico de América Latina*, Suplemento estadístico (1962), p. 8.

[179] *Ibid.*, p. 124.

[180] United Nations, *Boletín estadístico de América Latina* (1965), p. 11.

[181] Miró, "The population of Latin America" (1964), p. 19.

[182] Charles, "Population problems in the British . . ." (1945), p. 80; Borrie, *Population Trends and Policies* . . . (1948), p. 37. See also Borrie and Spencer, *Australia's Population Structure and Growth* (1965), p. 82.

[183] United Nations, *Demographic Yearbook, 1962* . . . (1963), p. 283.

[184] Ho, *Studies on the Population* . . . (1959), p. 265.

[185] Durand, "The modern expansion . . ." (1967), p. 137. The totals derived from a study of Ch'ing Empire annual population reports lie within ranges estimated at 180-234 million for 1750, 290-360 million for 1800, and 390-480 million for 1850, *ibid.*, p. 138; they are in virtual agreement with the assessments of Ho, *Studies on the Population* . . . (1959), p. 270, who also includes a discussion of the source material, pp. 47-64. See also Taeuber and Wang, "Population reports of the Ch'ing dynasty" (1960), pp. 403-417.

ravages of the T'ai P'ing Rebellion (1851-1864) and other upheavals and calamities of such severity that many areas suffered depopulation,[186] and by the end of the century the population size was apparently no larger than it had been fifty years before.

89. This total of 430 million for 1900 has also been calculated as a medium variant within a range of 385-494 million by backward extrapolation from the 1953 census figure of 583 million, assuming an average annual growth rate of 0.5 per cent.[187] The reliability of this census has not been established, but it is generally accepted as the best source for an insight into recent levels.[188]

90. Growth rates over fifty-year periods in the territory of modern India and Pakistan, in contrast to those of China, show a consistent trend of acceleration. The first total count of this area was carried out during 1867-1872, but it is usually assigned to the year 1872. A result of 203 million was officially raised to 233 million to rectify under-enumeration and omissions of area. A later study proposed 255 million as closer to the fact.[189] Estimates for this component included in the medium estimates for Asia in table II.4, at fifty-year intervals beginning 1750, are (in millions): 190, 195, 233, 285 and 434. For 1800 and by extension to 1750, a high variant of 214 million was reached by backward extrapolation from the total of 255 million, mentioned above, at the rate of 0.25 per year. A low variant of 160 million was derived from the application of a constant rate of decennial increase of 5.84 per cent postulated in a recent study.[190] From 1921, there has been a quickening of the upward trend, most pronounced in Pakistan. Adjusted data give intercensal rates of 1.0 per cent for 1921-1931 and 2.2 for 1951-1961 for this country, and corresponding rates of 1.1 and 2.0 for India.[191]

91. In its population growth trend, Japan has differed markedly from its Asian neighbours, both in the historical past and currently. As a frontier island in Asia, it appears to have had a growing population with expanding trade and colonization over a long period prior to its policy of isolation. The Tokugawa period (1600-1868) roughly corresponded with the sealing off of the country from all external relations, and during its early years there was a continuing increase in population. Thereafter, the level appeared to be stabilized according to official records dating from 1726 to 1852. The number of commoners ranged only between 26.5 million in 1726 to 27.2 million in 1852, with minor fluctuations to a low of 24.9 in 1792 and a high of 27.2 in 1828 as well. An estimate of total population required the addition of the excluded classes—the Imperial household, the nobility, military, and lords and their establishments at one end of the social scale, and those at the bottom of the scale such as beggars, prostitutes, homeless persons—thought by some to approximate 1.5-2.1 million and by others about 4.0 million. This "presumed stability" masked compensating regional variations and fluctuations, however.[192] There is some disagreement among scholars as to the relative importance of deliberate efforts as opposed to natural forces in checking growth in that era. Abortion is known to have been practised in the upper classes, infanticide was more prevalent among the peasants,[193] and famines, epidemics, earthquakes and other calamities were not uncommon.

92. After the Meiji restoration, the first survey, in 1871-1872, indicated a total population of 34.8 million,[194] and in 1920 the first census in the modern sense gave a total of 55.4 million.[195] Compared with other Asian countries, rates of population increase have been low in modern Japan, although not so low as in European countries.

93. According to official statistics, both death and birth rates were low in the 1870s and rose in the early Meiji period. Checking registered age groups by life table survival rates, one author has estimated that both rates were actually considerably higher, the death rate over rather than under 20, and the birth rate around 32 rather than 24. According to him, early Meiji growth was not associated with an increase in births, but with a slight decline in the death rate,[196] yet in 1920, the birth rate was higher than before, and it declined decisively beginning only after 1950. Whatever the course of mortality in the early Meiji period, the decline after 1920 has been rapid and continuous, as registered by a drop in the crude death rate from 25 in 1920 to about 7 in the 1960s.

94. There is general agreement as to population levels for the modern period of Japan at about 30 million for 1750 and 1800, 31 million for 1850, and 44 for 1900. The first increase at these intervals was registered for 1800-1850, an annual average of 0.1 per cent, followed by 0.7 for the next fifty-year period and 1.3 from 1900 to 1950 when the total was 53 million.[197] Like other industrializing societies, Japan has thus undergone a demographic experience involving falling birth and death rates,

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[186] See Ho, *Studies on the Population* ... (1959), pp. 236-248.

[187] Durand, "The modern expansion ..." (1967), p. 147.

[188] Taeuber and Wang, "Questions on population ..." (1960), pp. 263-310. Aird, in "Estimating China's population" (1967), pp. 61-72, considers some of the problems presented by recent Chinese population data.

[189] Davis, *The Population of India* ... (1951), pp. 24-48.

[190] Durand, "The modern expansion ..." (1967), pp. 137-138, 148-149. See also Datta, "A re-examination of Moreland's estimate ..." (1960), p. 167. Datta based the rate of 5.84 on increase between 1881-1931. If the period is extended to include the more questionable results of the census of 1871, the rate becomes 5.14 per cent. Other estimates of population in the area of present-day India, and of deaths resulting from seventeen famines occurring in the nineteenth century, are given in Sen Gupta *et al.*, "Estimates of 19th century population ..." (1969).

[191] Gille, "Accélération démographique en Extrême-Orient ..." (1961), p. 643.

[192] Taeuber, *The Population of Japan* (1958), pp. 21-27.

[193] *Ibid.*, pp. 29-30.

[194] *Ibid.*, p. 44. Durand, "The modern expansion ..." (1967), p. 149, reports that the official estimate for 1885 (given as 37.5 million in Taeuber, *The Population of Japan* (1958), p. 46) may be about 1 million too low. Durand cites Japan, Institute of Population Problems, *Meiji Shonen Iko Taisho 9-nen* ... (1962).

[195] United Nations, *Demographic Yearbook, 1962* ... (1963), p. 272. This total has been adjusted to relate to present territory; in the territory at the date of the census, i.e., including Okinawa, it was 56.0 million, and is given in Taeuber, *The Population of Japan* (1948), p. 60.

[196] Morita, "An estimation on the actual ..." (1963), pp. 48-49, 52.

[197] Durand, "The modern expansion ..." (1967), p. 137.

but its relatively low and controlled fertility at the outset distinguishes its demographic transition from that of most countries.

95. The population of Indonesia was estimated at 77 million for 1950. Official data, even when adjusted for deficiencies, give only an uncertain approximation of population for most years prior to 1961, when 96.3 million inhabitants were counted.[198] Backward extrapolations have been calculated on the assumption of growth rates of 0.2 per cent for 1750-1800 and 1.2 per cent thereafter, giving medium estimates of 12 million in 1750, 13 million in 1800, 23 million in 1850 and 42 million in 1900.[199]

96. For the remainder of Asia, estimated percentage rates of growth have been calculated which assume an unbroken upward trend, a pattern similar to that of India-Pakistan, but at a slightly higher level: 0.1 for 1750-1800, 0.5 for 1800-1850, 0.7 for 1850-1900, and 1.2 for 1900-1950.[200] A high rate of increase for Thailand in the early part of this century has continued on an ascending scale; between the censuses of 1947 and 1960 the population appears to have grown at the average annual rate of 3.2 per cent,[201] as it has for the Philippines between 1950 and 1960.[202] Intercensal growth for the Republic of Korea for 1955-1960 is likewise high, at an annual average of 2.9 per cent. Most recently, the trend of increase appears to have been accelerating. Around 1960, an annual percentage of near 3.2 is thought likely for the Republic of Korea, and as high as 3.5 for the Philippines, at which latter rate the number of inhabitants would double in twenty years.[203] The trend in rates of natural increase in China (Taiwan) may be of more import than the size of the country would warrant if it is indicative of the beginning of deceleration in this part of the world. Fertility declining faster than mortality is reflected in rates of natural increase which fell steadily from 37 per thousand population in 1952 to 27 in 1965 for China (Taiwan).[204]

97. For Iran and South-West Asia, where ancient civilizations had provided for flourishing populations, the demographic history is virtually unknown. However, the known facts of wars, famine and epidemic, and of continuous economic decline over a long period point to causes for a prolonged contraction in numbers of inhabitants. Indications of revitalization appeared in the nineteenth century, when Iran's numbers increased from a probable 6 million to somewhere in the range of 9-12 million over the 100 years.[205] United Nations estimates show growth becoming more substantial from 1920 on: an estimated 21.5 million inhabitants in 1960 represented an increase of 30 per cent in the preceding decade.[206] For South-West Asia and Iran as a whole, United Nations estimates give average annual growth rates of 1 per cent for the 1920s, increasing to about 1.7 for the 1940s and 2.7 per cent between 1950 and 1960.[207] Iraq's population as traced from 1867-1947 almost quadrupled, from about 1.2 million at the beginning of the period to 4.8 at the end. For 1905-1935 there was a loss of momentum and even slight reversal of the ascending rate in the preceding period, then a resumption of rapid increase.[208] An estimate of 5.1 million is given for 1950.[209]

7. AFRICA

98. The demographic situation of North Africa has been similar, in general, to that of Asia. In Egypt, a new cycle of growth from the low level reached under Mameluke chieftains is said to have begun under Mohammed Ali (1805-1848). Unreliable estimates imply that the population doubled during this period. An estimate for 1800 gave the population as about 2.5 million.[210] For 1882, the first census total of 6.8 million has been officially revised to 7.6.[211] The census of 1937 gave a total of 15.9 million and the implied average annual increase for the period is about 12 per thousand. External migration has not been a factor in the growth of Egypt's population. Records since 1934 indicate that crude birth rates between 45-48 have been the rule and that there has been a steady lowering in the crude death rate from about 35 to 20 by 1960. A pre-war level of increase of about 14 per thousand fell during the war, then slowly rose to about 25 by 1959 as a result of decreased mortality.[212] In 1960, 26 million inhabitants were counted.

99. According to official statistics, the Moslem population of Algeria increased from 2.3 million in 1856 to 6.1 million in 1936, at an apparent average annual increase of 12 per thousand. The rate was about 23, however, for the five years preceding 1937, slowed during the war, then reasserted itself and again approximates that level. In Tunisia, recorded rates of growth are lower, markedly so in most recent years, and in Morocco higher, but the pattern has been similar.[213] The following average percentage increases have been used in calculating

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[198] See Indonesia, Central Bureau of Statistics, *Statistical Pocket Book* ... (1947), p. 6; Oei, *Niederländisch-Indien* ... (1948). See also Keyfitz, "The population of Indonesia" (1953), p. 643; and de Meel, "Demographic dilemma in Indonesia" (1951); cited in Durand, "The modern expansion ..." (1967), p. 150.

[199] Durand, "The modern expansion ..." (1967), p. 137.

[200] *Ibid.*, pp. 137, 151.

[201] United Nations, *Demographic Yearbook, 1964* ... (1965), p. 164. See also Das Gupta *et al.*, "Population perspective of Thailand" (1965); Bourgeois-Pichat, "An attempt to appraise ..." (1960); Pasukniran, "Prachakorn khong Prathet Thai" (1960); and Gille and Chalothorn, *The Demographic Outlook of Thailand* ... (1963), p. 9.

[202] United Nations, *Report of the Asian Population Conference* (1964), p. 71.

[203] Gille, "Accélération démographique en Extrême-Orient ..." (1961), p. 643.

[204] United Nations, *Demographic Yearbook, 1958* ... (1958), p. 107; ———— *1965* ... (1966), p. 125.

[205] Herschlag, *Introduction to the Modern* ... (1964), p. 134 citing Fateh, *The Economic Position of Persia* (1926), p. 2.

[206] United Nations, *World Population Prospects as assessed in 1968* ...

[207] Rates computed from data in *ibid.* and United Nations. *World Population Prospects* ... (1966), pp. 140-141.

[208] Hasan, "Growth and structure of Iraq's population ..." (1958), p. 340.

[209] United Nations, *Demographic Yearbook, 1966* ... (1967), p. 124.

[210] Cleland, *The Population Problem* ... (1936), pp. 6-7.

[211] Kiser, "The demographic position ..." (1944), p. 385.

[212] El-Badry, "Trends in the components ..." (1965), pp. 144-145. 164. See also Baer, *Population and Society in* ... (1965), pp. 12, 25,

[213] Chevalier, *Le problème démographique* ... (1947), pp. 21-24,

"medium" estimates for North Africa as a whole: 0.2 for 1750-1800, 0.5 for 1800-1850, 1.2 for 1850-1900 and 1.4 for 1900-1950.[214]

100. Lack of statistical data and even of written history have made the size of population of most of Africa south of the Sahara a subject for conjecture until the present day. Widely disparate assessments have been offered by early western explorers, missionaries and officials. The post-war period marks a new era for African demography, although even today the vital statistics of the region are generally not known from comprehensive registration.[215] The extensive migrations of labour which characterize the present transitional phase of African development increase the difficulties of demographic measurement and analysis. Censuses taken in newly independent States represent first attempts at enumeration of total African populations for much of the continent and indicate greater numbers than previously supposed. Estimates are therefore subject to a wide range of possibilities according to various hypotheses about relevant factors.[216]

101. In general, it seems clear that African population has been growing rapidly since the Second World War. Most improvements of available information have led to upward revisions of the estimated growth rate. A rate of 2.4 per cent annually was estimated for all Africa in 1963-1968, the highest regional rate being that in Northern Africa—2.7 per cent.[217]

102. Kuczynski thought that many West African territories had a larger population before European slave trading than in the 1940s, but he was less positive about East Africa.[218] He also believed that the population of former British West Africa remained stationary during the first quarter of this century, and that East African population declined somewhat.[219] Martin supports the view that East African population before the First World War had changed very little over a century, and believes that it declined somewhat in the first quarter of this century, and then increased during 1930-1948 by rates in the range of 5 to 15 per thousand.[220] Growth has been least in Equatorial Africa, a region of low African fertility. In the Republic of South Africa, intercensal average annual rates of growth have been between 2.1 and 2.4 for the most recent period, except for 1911-1921 and 1936-1946. Total population had increased by 27 per cent between 1950 and 1960; Bantu population by almost 30 per cent and European by 18 per cent.

103. High natality serves the cultural requirements of the great variety of kinship systems that have been documented in African tribal society.[221] However, tribal customs governing marital relations and child care have usually been a deterrent to a realization of maximum fertility. Numerous explanations, in addition to the toll of endemic diseases, intertribal warfare of former times and famine, have been offered for the existence of areas of sparse settlement, relative low fertility, and probably depopulation. The incursions of the Europeans not only brought disease, but may have caused cultural shock and social disorganization which led to lowered fertility.[222] The relative importance of these factors affecting fertility is usually obscure. In most large tribal societies where contact with European population continued over a long period, the initial trend toward depopulation often experienced gave way to processes of adjustment, followed by a trend toward rapid natural increase.[223] Susceptibility to diseases introduced by Europeans may have been counteracted by the increasing practice of modern health measures.

E. Summary of regional trends, 1750-1965

104. The summary of rates of growth given in table II.8 as they relate to fifty-year periods for 1750-1950 indicate broad trends for major regions of the world. From a global viewpoint, population increased at a steady, modest pace until the first half of this century, after which a marked acceleration became apparent. The long-term trend was not uniform among regions, however, but embodied considerable variation. Decline was registered for North America, stability for Europe, fluctuations for the USSR and China, while for the remainder of Asia, and for Latin America and Africa a reflection of the steady over-all increase is found.[224]

105. This generally slow rise of the world trend, doubling its average rate of growth in 200 years, was broken by the spectacular acceleration apparent for 1950-1965. For these fifteen years, the rate was more than double that for the preceding fifty years. The number of inhabitants probably increased by about 70 per cent between 1800 and 1900 and by about 100 per cent between 1900

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[214] Durand, "The modern expansion . . ." (1967), p. 137.

[215] Martin, "Estimates of population growth . . ." (1961), pp. 49-53.

[216] For a survey of recent findings, see Spengler, "Population movements and problems . . ." (1964); Lorimer, *Demographic Information on Tropical Africa* (1961); and Coale, "Estimates of fertility . . ." (1966), pp. 173-181.

[217] United Nations, *Demographic Yearbook, 1968* . . . (1969), table 1.

[218] Kuczynski, *Demographic Survey* . . . (1948), vol. 1, pp. 13-14; vol. 2 (1949), pp. 120-122.

[219] *Ibid.*, vol. 1, pp. 13-15; vol. 2, pp. 122-123.

[220] Martin, "Estimates of population growth . . ." (1961), pp. 50-53.

[221] Lorimer *et al.*, *Culture and Human Fertility* . . . (1954), pp. 58-90, 118-125, 255-403.

[222] *Ibid.*, pp. 125-132.

[223] For review of evidence and bibliography on this subject, with reference to other regions, see Taeuber and Han, "Micronesian Islands under . . ." (1950), pp. 93-115; see also Rosenblat, *La población indígena* . . ., vol. 1 (1954), p. 121. The acculturation of tribal societies in India, where direct contact with Europeans has been largely limited to missionaries and administrators, does not seem to have involved any initial trend towards depopulation, but has led to generally high and rising rates of natural increase. See Sovani, *The Population Problem in India* . . . (1942), pp. 204-207.

[224] Broad temporal and territorial scale unavoidably mask the fluctuations which are responses to a complexity of agents of short duration or localized impact. As stated by Glass, "Population and population movements . . ." (1965), p. 238, "What is interesting is . . . the short-period variation, the movement of . . . fertility and mortality rates . . . territorial distribution of population in different points of time . . . social and other differences in fertility, and changes in marriage frequency and habits". For such a study relating to England in the period immediately preceding the Industrial Revolution, see Laslett, *The World We Have Lost* (1965).

TABLE II.8. ESTIMATED AVERAGE ANNUAL PERCENTAGE RATES OF POPULATION GROWTH, 1750-1965, FOR THE WORLD AND MAJOR REGIONS

Regions	*1750-1800*	*1800-1850*	*1850-1900*	*1900-1950*	*1950-1965*
World	0.4	0.5	0.5	0.8	1.9
Africa	0.0	0.1	0.4	1.0	2.2
North Africa	0.2	0.5	1.2	1.4	2.5
Remainder	0.0	0.0	0.2	0.9	2.1
Asia	0.5	0.5	0.3	0.8	2.0
China	1.0	0.6	0.0	0.5	1.8
India and Pakistan	0.1	0.3	0.4	0.8	2.2
Japan	0.0	0.1	0.7	1.3	1.1
Remainder of Asia (excluding USSR)	0.1	0.6	0.8	1.2	2.4
America	1.0	1.5	1.8	1.5	2.2
Latin America	0.8	0.9	1.3	1.6	2.8
Northern America	...	2.7	2.3	1.4	1.7
Europe (excluding USSR)	0.4	0.6	0.7	0.6	0.8
USSR	0.6	0.6	1.1	0.6	1.6
Oceania	...	...	...	1.6	2.2

SOURCE: Durand, "The modern expansion . . ." (1967), p. 137; 1950-1965 rates computed from data in United Nations, *World Population Prospects as assessed in 1968 . . .*

and 1965, with an increase of 30 per cent taking place between 1950 and 1965. With the exception of Japan, all major regions of the world contributed to the most recent trend of expansion, including those regions where the former general trend of increase had reversed. This downturn appeared first in North America in the period 1850-1900 and next in Europe's moderate level in the following fifty-year period, signifying that declining fertility outbalanced a lengthening life span as industrialization transformed living conditions. The low rate for the USSR in the first half of the twentieth century may be ascribed in part to unusually heavy losses in a period that included two world wars. Thus, as Japan joined the ranks of the industrialized nations, from 1950 it also experienced the demographic transition from high to low mortality and fertility.[225]

106. Where the demographic transition first occurred, in countries of European settlement, wide gaps between gradually descending mortality and fertility rates did not develop. In general, the slow fall of mortality acted as a brake on population growth until the downtrend of fertility gained momentum. These countries and Japan combined (the more economically developed regions), had an average growth rate of 1.2 per cent for 1960-1965.[226] The remainder of the world, comprising about 70 per cent of the world's 1965 population, had a corresponding rate of 2.3 per cent. Here, the recent, relatively rapid decline in mortality is not a reflection of the technological advance which has been found to foster attitudes favouring smaller families; it rests upon the experience of the more industrialized societies in combating disease and famine. High birth rates have begun to give indications of lowering in some instances, but a repetition of the intense and rapid industrialization which accompanied Japan's decline in vital rates has not yet appeared. Without this impetus to social change, the prospect appears to be one of continued rapid growth for some time to come. This prospect is discussed in chapter XV.

107. The scientific measurement of man's numbers has been attempted only in comparatively recent times, and as yet falls considerably short of total world coverage.[227] Acknowledging the imperfection of the information now available, it is nevertheless evident that the numerical expansion of the human race has been sporadic. There have been periods when populations grew at a comparatively rapid rate, others when they remained nearly stationary or experienced depletion. The periods of growth have not been synchronous in different areas. Diversity in the patterns of economic and social change has been matched by a diversity of population trends.

108. In earlier centuries, the pace of demographic growth appears to have been linked to the achievement of a social and political order which more or less successfully related population to the economic resources attainable. Populations were in the short run at the mercy of violent swings of mortality, but in the secular movements of population, fertility is likely to have been a major determinant of the trend, although the mechanisms for social control of fertility were, and to a large extent remain, of infinite variety and differ in their adaptability to changing conditions. There is no warrant in population history for a belief that until recently most of mankind subsisted in a uniform state of natural propagation, with a fertility close to the maximum level, passively responding to the changing toll of death.

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[225] Relative levels of the two fundamental factors determining population change may be summarized broadly for the modern period in three demographic régimes: high fertility and mortality; high fertility and declining mortality; low fertility and mortality. The transition from one to another of these stages is discussed in chapter III.

[226] Rates computed from data in United Nations, *World Population Prospects as assessed in 1968 . . .*

[227] During 1855-1864, population censuses were taken in fifty-one countries and covered about 17 per cent of the world's population. Censuses taken in 1945-1954, which included that of China, counted about 78 per cent of the world; in 1955-1964, world coverage was about 67 per cent, when 202 countries had censuses, United Nations, *Demographic Yearbook, 1962 . . .* (1963), p. 1.